Commonwealth Agricultural Bureaux

Nineteenth Annual Report

OF THE

Executive Council

1947-1948

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COMMONWEALTH AGRICULTURAL BUREAUX

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(December 1948)

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PREFACE

The Imperial Agricultural Research Conference, 1927, stressed (*a*) the need for scientists to be in touch with the progress of research throughout the world in their several branches, and (*b*) the difficulty therein owing to the great output of scientific literature and the diversity of languages in which it is published.

It recommended the Governments of the British Commonwealth to establish on a joint co-operative basis eight bureaux to collect, collate and disseminate information on research in eight selected branches of agricultural science and generally to assist research workers in the Commonwealth and Empire with information relevant to their subjects. Each bureau was to be located at a research institute specialising in its own branch of science so that the bureau officers should be in daily contact with men engaged on research in its own subject. These bureaux were to be financed from a common fund contributed by Commonwealth Governments in agreed proportions and controlled by a Council composed of representatives of those governments on an equal footing.

Governments accepted these proposals. In November, 1928, a new type of inter-Imperial co-operative agency acceptable to all governments was worked out in detail. On 1st April, 1929, the Executive Council of the Imperial Agricultural Bureaux* came into being. The eight bureaux started work in that year.

Following the Ottawa Conference of 1932, the work of several inter-Imperial agencies was examined and reported upon by the Imperial Committee on Economic Consultation and Co-operation (1933). This Committee approved of the bureaux organisation and of its work, and extended the duties of the Council, *inter alia*, proposing that with effect from 1st October, 1933, it should also be responsible for the supervision and administration and finance of the Imperial Institute of Entomology and of the Imperial Mycological Institute.

It also enunciated certain general principles to be observed in regard to the organisation of agencies for inter-Imperial co-operation and consultation, e.g., constitutional equality of participating governments in the appointment of the authority administering the work; the provision of adequate finance for a definite period of years; careful and periodical examination of the work and organisation of the agency at Commonwealth conferences suitable for the purpose, as without that assurance governments could hardly be expected to provide the adequate continuing finance; responsibility of the administering authority to all participating governments. All Governments accepted this report.

The British Commonwealth Scientific Conference (1936) conducted the first of these "periodical examinations." It approved both the work and organisation. It recommended the finance necessary until 1941-42 (extended later to cover the war period), its distribution between governments, also the formation of two more bureaux, and certain modifications in practice designed to improve general efficiency. Governments accepted these proposals.

A Review Conference was held in the summer of 1946 just one year after the close of the war. This was the first since 1936 and was only the second "periodical examination" since the recommendations of the Imperial Committee on Economic Consultation and Co-operation in 1933. Here it may be recorded that the Review Conference recommended that the Parasite Service should continue to be located at Belleville, Canada, that it should become an individual bureau and that its name should be changed to the Bureau of Biological Control to denote its separate entity. It also decided that information on general husbandry should be provided within the framework of the existing bureaux which, in turn, necessitated the name of the Bureau of Pastures and Forage Crops being altered to Pastures and Field Crops. Both changes of name were made on 1st April, 1947, which coincided with the opening date of the new review period when the recommendations of the conference officially came into force.

* From January 1, 1948, the name of the organisation was changed to Commonwealth Agricultural Bureaux.

As a measure for paper economy, the usual list of publications has been omitted from this report. Copies of the 1948 list are, however, available for those desirous of consulting them, and will be supplied on application to:
The Commonwealth Agricultural Bureau, Central Sales Branch,
Agricultural Research Building, Penglais, Aberystwyth, Wales.
or to the Secretary, Commonwealth Agricultural Bureaux,
2, Queen Anne's Gate Buildings, Dartmouth Street, London, S.W.1.

The organisations under the administration of the Executive Council are:—

The Commonwealth Institute of Entomology.

The Commonwealth Mycological Institute and the Commonwealth Bureaux of—

Agricultural Parasitology (Helminthology).
Animal Breeding and Genetics.
Animal Health.
Animal Nutrition.
Dairy Science.
Forestry.
Horticulture and Plantation Crops.
Pastures and Field Crops.
Plant Breeding and Genetics.
Soil Science.

Commonwealth Bureau of Biological Control.

The Commonwealth Potato Collection.

A "liaison" officer appointed by the appropriate department in each participating country keeps in touch with administrative matters, and in each country for each bureau a scientific officer is nominated as Official Correspondent to be the "general friend" on scientific matters of that bureau in that country. The Heads of the several Institutes at which bureaux are located act as Consultant Directors of the bureaux, thus giving the Council and bureaux the benefit of their wide experience and scientific knowledge. All other officers are whole-time servants of the Executive Council.

REPORT

At its meeting on the 13th December, 1948, the Executive Council of the Commonwealth Agricultural Bureaux adopted the following report on its 19th year of work—1st April, 1947 to 31st March, 1948—the first year of the 5-year Review period 1947-48 to 1951-52.

2. Conditions resulting from the war have not generally improved very much. There is still great difficulty about staff though, despite changes, there have always been enough to avoid a breakdown ; the cost of living is rising and, if this continues, some adjustments will be necessary. There are still arrears of work, though by the end of 1948-49 most arrears should be cleared ; paper shortage has not seriously affected the organisation during the year though matters looked serious at one period.

RECOMMENDATIONS OF THE REVIEW CONFERENCE, 1946

3. The period covered by this report is the first completed year of the current Review period 1947-48 to 1951-52. Action has not yet been taken on all the recommendations. The following notes show those on which some action has been taken so far. The recommendations are written out but, for those who wish to refer back to the Review Conference Report,* the small roman figures given are those of paragraph 19 of that report. The figure in brackets at the end of each recommendation refers to the actual paragraph of the Review Conference Report where the full detail will be found. It may be noted that the following sections contain statements of fact and general directions of policy requiring no specific report of action at this stage. (i), (ii), (iii), (iv), (vi). (viii), (xxi), (xxii), (xxxii), (xxxiii), (xxxiv), (xl), (xlvi), (liv), (lv), (lvii).

4. (vii) *Official Correspondents. The Conference recommends that each country should examine the working of the system of Official Correspondents in its country and should take such steps as may be suitable in the circumstances to see how the system can be improved for furthering the work and usefulness of the bureaux and should inform the Executive Council of any changes or alterations it proposes. (Paragraph 26.)*

Information has been received from Australia and from India, of meetings of Official Correspondents to discuss various questions connected with the internal organisation and for furthering the work and usefulness of the bureaux.

5. (ix) *Responsibility for Journals. Publications issued by the bureaux have earned a high degree of confidence amongst those that use them. It is essential to maintain and increase that confidence. The responsibility for the quality of those publications rests primarily on the Directors, but the Conference recommends the Executive Council so to arrange the staffing of the bureaux that Directors are not unduly occupied in routine abstracting so as to prevent the formation of those direct contacts which the Conference considers important. (Paragraph 28.)*

The increase in staff generally has relieved directors of a considerable amount of routine abstracting. It may be as well to sound a note of warning. While it is a disadvantage that the director should spend too much time on abstracting it is at least as great a disadvantage if he spends too little. A certain amount of actual abstracting should be done by directors and a considerable amount of editing and general composition of abstracts.

6. (x) *Abstract Journals. The Executive Council should review from time to time the frequency of publication of the abstract journals. It should, also, examine the most practical and useful manner for publishing lists of the periodicals regularly examined by the various bureaux in the preparation of those journals. (Paragraph 29.)*

Frequency of publication is continuously under review. The Bureau of Pastures and Field Crops now publishes the Journals " Herbage Abstracts " and " Field Crop Abstracts " alternately. Each is published every two months so that one of the journals is published each month. The Bureau of Soil Science has recently changed its journal from a quarterly to a two-monthly.

7. An abstract journal can have too many pages. The journals are designed partly for the reader in out-of-the-way places who has no ready access to libraries. Often the only opportunity he has for studying abstracts is at the end of a long day in the field. He is far more likely to read an abstract journal of 100 pages than one of 200 pages. From this point of view, when the number of abstracts makes a quarterly production too big, it should be published every two months and, if necessary, every month. The Review of Applied Entomology and the Review of Applied Mycology are both published monthly.

* Imperial Agricultural Bureaux Conference Report. Cmd. 6971.

Another advantage of a shorter publication interval is that abstracts are more up to date. The shorter the time lag between the original publication and the publication of the abstract the better. Unfortunately, however, it requires considerable organization to change from quarterly publication to monthly publication.

8. (xi) *Technical Communications. The Conference recommends that in the preparation of Technical Communications, especially of those dealing with subjects under active investigation in several parts of the Commonwealth, the bureau concerned should make a practice of circulating its proposals and also the manuscripts, before those are finally accepted for publication, and requests the Executive Council to see that this practice is followed.* (*Paragraph 30.*)

The circulation of Technical Communications prior to publication is increasing. It is not always possible to do this, for example, when a recognised specialist outside the bureaux organization is asked to write a Technical Communication for the bureaux.

9. (xii) *Publicity. The circulation of all the journals has increased, but many in contributing countries to whom they should be of use rarely see them and some may not know of them. The Conference recommends that all possible steps be taken both in contributing countries and by the Executive Council to increase the use and distribution of bureaux publications throughout the Commonwealth and elsewhere.* (*Paragraphs 31 and 32.*)

(xiii) *Prices. Abstract Journals are still priced at pre-war levels. The Conference recommends the Executive Council to consider the advisability of raising all or some of these rates to accord more nearly to present levels. In this connexion the Executive Council should consider the possibility of offering to supply participating governments, if necessary up to some limit, with copies at rates below the new prices which may be fixed in return for standing orders and consolidated payments.* (*Paragraph 33.*)

This question of increased circulation is continually kept in mind. It affects all Directors to a greater or lesser degree but is more especially the concern of the Secretary and of Central Sales. The new prices fixed by the Executive Council are given in paragraph 79.

10. The Executive Council have carefully considered the whole question of departmental concession rates. They have not been able to offer any departmental concession rate for the Bulletin of Entomological Research, Index Veterinarius, Nutrition Abstracts and Reviews or the reprinted portion of Forestry Abstracts—Forest Products and Utilization—but they have been able to offer considerable concessions for all the others. For the Review of Applied Entomology and the Review of Applied Mycology the departmental concession rate is unconditional; for the other journals it is conditional on Governments ordering a certain minimum number of volumes, in which case Governments are at liberty to select the numbers of each journal to make up the total number ordered.

11. (xiv) *Scope of Journals. The Conference brings to the attention of the Executive Council the desirability of preparing and issuing a conspectus showing the subjects or aspects of subjects covered by the journals issued by the institutes and bureaux and how they supplement each other.* (*Paragraph 34.*)

Considerable work has been done on the conspectus of each bureau and to amalgamate them into one conspectus. There is also a frequent demand for a general history of the bureaux showing their functions, scope and organization. This, therefore, is being combined with the conspectus in a single publication. It has proved a longer job than was anticipated and is by no means complete.

12. (xv) *Exchange. The Conference considers that the exchange of bureaux publications could, in the interests of abstracting, be extended and that, when exchange is not practicable, adequate provision should be made for the purchase of journals. It commends this whole question to the attention of the Executive Council.* (*Paragraph 35.*)

This is being attended to.

13. (xvi) *Stocks. The Executive Council is requested to examine the situation which may arise from accumulation of back numbers of journals and publication.* (*Paragraph 36.*)

Nothing very much has been done about this. The back numbers for the bureaux are now stored by the Central Sales Branch at Aberystwyth. The position is not acute and little more can be done until Central Sales moves nearer Headquarters when the question of a general store will have to be considered. There is great difficulty with storage of some of the Institutes' records. This is bound up with the general question of accommodation at the Institutes.

14. (xvii) *Difficult Languages. The Executive Council is requested to endeavour to secure translators for certain of the more difficult languages and to keep under constant notice the possibility of the use of microfilms and other methods of photographic reproduction for the supply of copies of papers.* (*Paragraphs 37 and 38.*)

The question of difficult languages is under constant review. It varies in different bureaux, but on the whole the important languages of the world are covered. Finnish and Japanese are perhaps the two most important languages which present difficulties. The Institute of Mycology has installed a microfilm apparatus.

15. (xviii) *Notification of vacancies in senior posts. With a view towards ensuring overseas experience within the organizations under the Executive Council and towards maintaining the staff on a broad general basis the Conference considers it desirable that information of vacancies among scientific and technical staffs should be circulated to contributing countries.* (*Paragraph 39.*)

All vacancies of director and assistant director have been notified to all contributing countries. The response from overseas has been poor.

16. (xix) *General Staff Matters. The Conference recommends the Executive Council to consider the establishment of some form of Whitley machinery suitable to the condition of the bureaux for the joint discussion of staff questions.* (*Paragraph 40.*)

The Executive Council have intimated that they are prepared to give recognition to three service associations. At the close of the year no association had reached the stage of application to Council for recognition, though preliminary correspondence and meetings to form such associations have taken place.

17. (xx) *Standing Scientific Committee. The Conference recommends the Executive Council to form a Standing Scientific Committee composed of Consultant Directors or Directors and scientific representatives of the contributing countries to meet independently for consideration of the scientific work of the institutes and bureaux and to meet with the Executive Council for consultation.* (*Paragraph 41.*)

All the contributing Governments have been consulted about the final form that the Standing Scientific Committee should take and concur that there should be a nucleus of three scientists in the U.K. supplemented by nominees of the various governments. This Standing Scientific Committee is now in the process of formation.

18. (xxiv) *Insecticides and Fungicides. The Reviews of the two Institutes should be expanded to cover information on insecticides and fungi in the way needed by entomologists and mycologists.* (*Paragraph 47.*)

The two Institutes are covering information on insecticides and fungicides.

19. (xxv) *Entomology—Arrears in abstracting. Arrears of abstracting have arisen in the Institute of Entomology from causes connected with the war. With a view of clearing them promptly the Director should examine the possibility of obtaining from various Empire countries abstracts of entomological papers published in those countries.* (*Paragraph 48.*)

It is still hoped that the arrears in the Abstracts of Entomology will be made up by the end of 1948. Arrangements have been made to receive certain abstracts from overseas.

20. (xxvi) *Extension of information service. The Conference favours the extension of the information service of the Institute of Entomology to cover*

(a) *information on the morphology and physiology of insects.*

(b) *the issue of maps showing the distribution of insect pests, and*

(c) *the issue of a monograph on the pests of stored grain,*

but considers the inclusion of information on apiculture unnecessary at present as being sufficiently covered by other publications. (*Paragraph 49.*)

As instructed, item (a) has been included on the agenda of the Fifth Entomological Conference to be held in July, 1948.

Item (b) presents difficulties from the Entomological point of view. These do not exist for Mycology where the idea of such distribution maps arose. This also is being referred to the specialist conference.

Item (c) has not yet been done.

21. (xxvii) *Accommodation. The Conference urges the Executive Council to endeavour to secure adequate accommodation for the publications or bureau branch of the Imperial Institute of Entomology in close proximity to the Natural History Museum.* (*Paragraph 50.*)

Enquiries are being made about this accommodation but nothing has so far materialised. The housing situation is still very difficult.

22. (xxviii) *Staff. The staff of the Imperial Institute of Entomology should be increased by two systematists.* (*Paragraph 51.*)

The two systematists have been appointed.

23. (xxix) *Mycology—industrial mycology and antibiotics. The literature on industrial mycology and antibiotics is increasing rapidly. The Mycological Institute should follow its present practice*

of providing abstracts of papers specifically relating to mycology. Cross references to other abstracting journals can be inserted in the Review drawing attention to border line papers in industrial mycology. But, if the increase in papers is such as to overload the Review in its present form, the Director should refer the question to the Executive Council for consideration.

In view of the number of interests involved, the question of abstracting literature on the rapidly expanding subject of antibiotics should be referred to the Standing Committee of the British Commonwealth Official Scientific Conference. (Paragraph 52.)

The Institute continues to include the papers specially related to mycology confining itself to those fungi which do harm to industry. As instructed the general question of abstracting literature on anti-biotics has been referred to the Standing Committee of the British Commonwealth Scientific Official Conference and further action now rests with them.

24. (xxx) *Accommodation. Steps should be taken at an early date to double the accommodation at the Imperial Mycological Institute. (Paragraph 53.)*

The matter is under consideration. No definite plans have yet been evolved.

25. (xxxi) *Staff. Additions to clerical staff beyond those provided for the estimates presented to the Conference are needed. (Paragraph 54.)*

The staff position is always under consideration. At present the clerical staff is sufficient to cope with the work.

26. (xxxv) *Location. Bureau of Biological Control. The Conference recommends that the Headquarters of this Service should continue to be located at Belleville for at least the period until the next Review Conference and can see no reason why it should not continue at that centre thereafter. It also considers that in addition to substations at Riverside (California), in Argentina and one in the West Indies, one in the Mediterranean region of Southern Europe should be established. (Paragraph 57.)*

The headquarters of the Bureau of Biological Control are being transferred to Ottawa where accommodation and conditions are better than at Belleville. The substation has not been opened in the Mediterranean region as on further consideration it was found that Switzerland was better. It was therefore opened in Zurich.

27. (xxxvi) *Government of Canada. Without the hospitality and assistance given by the Government of Canada and its Entomological Service, the Imperial Parasite Service could not have survived the War. The Conference records its great appreciation of this assistance and of the continuing interest of the Government of Canada in this service and also for the help in management given by the Advisory Committee in Canada. (Paragraph 58.)*

The former Canadian advisory committee ended officially with the war. It has been reconstituted as a normal committee and consists of—

Dr. K. W. Neatby—Director of Science Service (Chairman).

Dr. W. H. Brittain—Vice-Principal, Macdonald College.

Mr. H. G. Crawford—Dominion Entomologist.

Mr. A. B. Baird—Officer in charge, Dominion Parasite Laboratory, Belleville, Ontario.

Mr. H. L. Trueman—Liaison Officer in Canada for C.A.B. (Secretary).

Dr. W. E. Steenburgh, Research Adviser to the Director of the Science Service is alternate for Dr. Neatby.

28. (xxxvii) *Staff. The Entomological staff required for the work envisaged will, in addition to the Director, be 7, viz., 2 at Riverside, 2 in South America, 1 in the West Indies, 1 in the Mediterranean Europe and 1 at Headquarters—Belleville. (Paragraph 59.)*

This staff has not yet been recruited in full and will only be recruited as it becomes necessary. There are now the Director and 5 entomologists stationed 1 in Riverside, 1 in South America, 1 in the West Indies, 1 in Switzerland and 1 at Belleville.

29. (xli) *Title. The title of this Service should be changed to the Imperial Bureau of Biological Control to denote its separate entity. A section at the next Imperial Entomological Conference should be devoted to a consideration of the biological control of insects and weeds. (Paragraph 63.)*

The title has been changed. Biological control of insects and weeds is an item on the agenda for the Fifth Entomological Conference in July, 1948.

30. (xlii) *The bureaux—Accommodation. The Conference draws the attention of the Executive Council to the general question of accommodation for the bureaux with special reference to the needs of the bureaux of Dairy Science, Forestry, Animal Health and Animal Breeding and Genetics, the needs for the first two of these, and especially that of Dairy Science, being immediately pressing. (Paragraph 64.)*

The accommodation question in the United Kingdom is still extremely difficult. No progress has been made for Animal Health and Animal Breeding and Genetics while for Dairy Science only the plans and estimates have been started for an expansion at Shinfield. The only substantial progress is in the accommodation for the Forestry Bureau which is being housed in the new building for the Department of Forestry in the Parks at Oxford. The building is nearing completion though much remains to be done. It might be ready in 1949.

31. (xliv) *Animal Health. The Executive Council is directed to consult with the Ministry of Agriculture and Fisheries on measures for improving the Library at the Veterinary Research Institute. Consideration should also be given to the publications by the Bureau of Animal Health of a journal of Veterinary Reviews and Annotations.* (*Paragraph 67.*)

The Library position at the Veterinary Research Institute is still unsatisfactory. It will be a considerable time before there is an improvement. It has not yet been possible to start Veterinary Reviews and Annotations.

32. (xlv) *Animal Nutrition. The Conference approves of the present scope of the Bureau of Animal Nutrition and does not consider that it should be extended to cover food technology.* (*Paragraph 68.*)

The whole subject of food technology has been under consideration by the Food Investigation Board, which is under the Department of Scientific and Industrial Research, in conjunction with the Executive Council. The Low Temperature Research Station (D.S.I.R.) is to issue an abstract journal, to be called "Food Science Abstracts," covering the whole of food technology. A scheme of co-operation with the Commonwealth Agricultural Bureaux is being worked out so as to avoid overlap and unnecessary duplication.

33. (xlix) *Agricultural Parasitology. The Bureau of Agricultural Parasitology should be continued and should be supported to the full. The Executive Council should take immediate action to ensure its continuance.* (*Paragraph 72.*)

This bureau is being continued and is fully supported.

34. (l) *Dairy Science. The Bureau of Dairy Science was started late in 1938 and has had no chance to build up a competent staff. The position is now critical. The Executive Council is urged to remedy as soon as possible the handicaps under which this bureau is working.* (*Paragraph 73.*)

The position is still very difficult. It has so far been impossible to find an assistant director and the bureau has been unlucky in losing trained scientific assistants. A Director with four trained scientific assistants can just about keep going but cannot make up arrears. When the scientific assistants keep changing then it is not possible even to keep up to date.

35. (li) *Forestry: The conference approves of the issue of the Forestry Abstracts in two parts as an experiment. The activities of this bureau will probably be reviewed at the Empire Forestry Conference to be held in 1947. If so that conference will probably indicate the extent to which and the manner in which the Forestry Bureau should cover utilization. A strong recommendation should be made to contributing governments to promote the distribution of Forestry Abstracts to their officers in the field.* (*Paragraphs 74 and 75.*)

All necessary action has been taken. The Forestry Abstracts cover the whole of forestry. The part, however, which covers Forest Products and utilization is also issued as a separate publication.

36. (lii) *Plant Breeding and Genetics. The conference stresses the usefulness of the Technical Communication for the Bureau of Plant Breeding and Genetics and of the other bureaux. It considers it desirable that contributions from overseas workers should be invited for such publications.* (*Paragraph 76.*)

A determined effort has been made to increase the production of technical communications. Previously the average of technical communications in a year had been about ten; in 1948-49, if the forecasted production is achieved, the total should be increased considerably.

37. (liii) *Staff in the bureaux. The bureaux are understaffed for the work in sight. The conference considers the minimum requirements to be 8 new posts of senior scientific officers qualified to supplement the Directors and 14 additional posts in the other two scientific or technical grades (with some additional clericals and typists).* (*Paragraphs 77 to 80.*)

Most of the staff recommended has now been recruited. All bureaux now have assistant directors except Soil Science, Dairy Science and Pastures and Field Crops. It should be noted that no supplementary staff, except an assistant director, was provided in the Review Conference report for the Bureau of Pastures and Field Crops, though the greatest increase in work was allotted

to that bureau. Actually some increase has been provided by adjusment and, if finances improve, more will be provided.

38. (lvi) *Commonwealth Potato Collection. The conference recommends that the Potato Station be continued on a co-operative basis for a further 5 year period during which the staff continuously at the Station should be engaged on work connected with its description, i.e., taxonomic and chromosome count and determining the characteristics of the material, e.g., resistance to disease, frost, etc., and response to environmental factors. Chemical and biochemical analysis is outside this work. Genetical work, on the other hand, should be conducted by officers deputed from co-operating countries for periods of two years or more. This programme of work will require continuously at the Station 2 botanists, 2 plant pathologists and 2 plant physiologists. Further accommodation will be needed, viz., freezing equipment and another greenhouse, air conditioned, and probably somewhat more land. It is desirable, if possible, that the scientific staff continuously engaged at the Potato Collection be drawn from the various co-operating countries. (Paragraphs 82 to 88.)*

The work continues. The additional staff recommended had not been recruited at the close of the year. It is likely to be recruited soon.

39. (lviii) *Central Sales and Stores Branch. Relief of the bureaux from routine administrative work, wide distribution and simplification of means for purchasing bureaux publications are obvious administrative improvements, the further promotion of which is a matter for the Executive Council. (Paragraph 90.)*

It has still not been possible to move Central Sales back nearer Headquarters. Rents in London are still very high and accommodation very difficult to find. The handicap of having Central Sales divorced from Headquarters is becoming increasingly great. When Central Sales went to Aberystwyth the total annual receipts were approximately £3,500. Annual receipts are now approximately £12,000 and are rising. With a business of that size Head Office needs almost daily and fairly continuous contact with Sales. Under present conditions considerable time is wasted in three cornered correspondence and efficiency is impaired because of the necessity of divided control and the consequent loss of full knowledge of all circumstances. Efforts to solve this difficulty are continuous.

40. (lix) *Finance. Additional finance is needed for all activities under the Executive Council both* (a) *to meet the post-war change in the level of costs and* (b) *to provide for the additional establishment recommended by the conference. The present financial position is reviewed. (Paragraphs 91 to 98)*

There are no recommendations here for action by the Executive Council. But see under lxiv below.

41. (lx) *Estimates of average annual cost of each of the Institutes, the ten bureaux and headquarters, the Parasite Service and the South American Potato Scheme for the five years 1st April, 1947 to 31st March, 1952, adopted by the Conference are set out in Statement I attached to the Report. These provide for capital expenditure on the South American Potatoes estimated at £800, but do not include two items of capital expenditure recommended by the conference and provisionally estimated at £25,000 and £10,000 respectively. The conference trusts that the governments will provide these two capital amounts when the Executive Council has obtained proper estimates and is in a position to make detailed proposals. (Paragraphs 99, 100.)*

The sum of £800 for a controlled temperature chamber for the Potato Collection is being provided during 1948-49. The other two capital sums of £25,000 and £10,000 for the expansion of the Mycological Institute and for extra greenhouses and temperature control chambers for the Potato Collection present more difficulties. As the report says, the exact cost cannot be known till proper estimates are prepared.

42. To expand the Mycological Institute it is first necessary to find a site. Though this has been actively sought nothing suitable has been found. The Director of Kew Gardens has not yet agreed that expansion can take place on Kew Gardens land because so far no area has been found adjacent to the Mycological Institute which did not interfere with the future expansion of the Kew Gardens herbarium and library building.

43. An area across Ferry Lane is under consideration; but it is not entirely suitable. It means buying unsuitable buildings along with the land and then letting them or otherwise disposing of them and it is not yet certain that the planning authorities would permit building on the unoccupied portion of the land. Even if all these difficulties could be overcome it will cost £10,000 before anything is spent on the building itself. The matter had not been decided at the close of the year.

44. The Potato Collection capital expansion, put tentatively at £10,000, was estimated at £24,000 when examined more carefully by an

architect. A more modest proposal, costing approximately £8,000 is under consideration, and will be reported upon next year.

45. It appears undesirable to approach Governments for such expenditure between conferences. If capital expenditure is required then a complete plan and estimate should be put before the Review Conference for consideration. The Review Conference and Governments then know exactly where they are and can accept or reject a definite proposal. This will probably be the eventual action on the items in paragraph 41 above. A detailed plan and proposal is likely to be put before the next Review Conference for examination. The difficulty is how to manage at the Mycological Institute in the interim.

46. (lxi) *Scale of Contributions. The Conference recommends that the scale regulating contributions by governments to the bureaux be adopted for such contributions to each of the five activities under the Executive Council. (Paragraphs 101, 102.)*

The same basal scale has been adopted but see paragraph 49 et seq.

47. (lxii) *The conference recommends that the funds for the five activities under the Council be kept distinct, though all are placed on the same basis, that the total sum annually provided by way of contributions for these five activities over the five years 1947-48 to 1951-52 or till the next Review Conference be held be £127,200 but, in view of the recoveries made through income tax, suggests that H.M. Government in the United Kingdom be requested to consider whether it would not take responsibility for a somewhat higher percentage than 30 units out of 160. (Paragraph 103.)*

Done, but see paragraph 49 et seq.

48. (lxiii) *Increase in United Kingdom share. H.M. Government in the United Kingdom is unable, on principle, to accept the suggestion that its share in contributions should be conditioned by local rates of taxation. It is impressed, however, with the desirability of placing contributions to all these enterprises on the same agreed financial scale. To further that object and in view of the benefits derived by the United Kingdom from these enterprises it is prepared to take a higher proportion than has hitherto fallen to it, on the understanding that other participating governments will accept their shares and so place all these five activities under the Executive Council on a common agreed financial basis. For this purpose H.M. Government in the United Kingdom agrees to raising the total number of units to 170 of which it will take 40. (Paragraphs 104, 105.)*

No action required by Council.

49. (lxiv) *Contributions. This has the effect of reducing the value of each unit from £795 to £748. The conference recommends the several governments to contribute the sums set out in the table in paragraph 107 for each of the five years 1947-48 to 1951-52 or until the next Review Conference, if that cannot be assembled on the date forecast, and to provide capital sums roughly estimated at £25,000 and £10,000 respectively on receipt of detailed proposals from the Executive Council. (Paragraphs 106 to 109.)*

The recommended contributions have been accepted by Governments and are being paid annually. There is a minor matter concerning the adjustment of the contributions between India and Pakistan but this will no doubt be satisfactorily settled. India has proposed that she pay 8/11ths of the former contribution and has paid it. Pakistan's formal acceptance of the remaining 3/11ths is still awaited but Pakistan is taking full part in all activities. Ceylon, having now become a dominion, is, for the time being, continuing to pay the contribution she formerly paid as a colony.

50. Excluding the capital sums referred to in paragraph 109 of the Review Conference Report, the financial provision made was adequate for four out of the five activities, namely annually £20,740 for the Institute of Entomology, £12,750 for the Mycological Institute, £12,750 for the Bureau of Biological Control (Parasite Service) and £8,840 for the Commonwealth Potato Collection (South American Potatoes). It was not perhaps so adequate for the fifth fund of £72,080 for the ten bureaux if the various recommendations of the conference were to be carried out.

51. The first year of a period of expansion is almost always a year of saving partly because the full expansion cannot coincide with the opening of the period and partly because the effect of increments in salaries is not felt. It is in the second year that the main effects of expansion begin to appear.

52. The estimate for the ten bureaux for the second year of this period (presented about January, 1948) showed an anticipated expenditure of approximately £97,000 against the £81,000 estimated at the time of the Review Conference. Of this £97,000 some £26,000 was for publications. Theoretically publications pay for themselves ; but the income does not necessarily accrue

in the year in which the expenditure occurs. During a period of expanding publication a reserve is necessary to finance publications till receipts from their sales are received ; but this Review Conference period opened in April, 1947, with a reserve of only some £8,000, enough for only approximately a month's expenditure at £97,000 a year.

53. The position at the time of the 1948-49 estimates was thus difficult. The savings for 1947-48 were not exactly known when the estimate for 1948-49 was considered. The only way to reduce expenditure is to hold up publications, and in practice that means holding up *new* abstract journals and Technical Communications, or dismissing staff. To hold up publications is failing to produce the very thing for which the organization was established ; to dismiss staff means that publications could not be produced even if funds turn out to be adequate. Yet, if estimates were correct, all that was necessary was *temporary* financial accommodation to augment the low reserve of £8,000 and even that would not be necessary if receipts from sales began to return fairly soon after publication.

54. The Executive Council therefore decided to sanction the 1948-49 estimated expenditure and, if it became necessary, to use the reserves of the other four funds as security for a temporary overdraft for bureaux expenditure, the accounts, of course, still being kept separate. Since the close of the year most Governments have already endorsed this decision. After the close of the year it became evident that the savings of 1947-48 together with the annual contributions and normal receipts from sales would cover the expenditure of £97,000. If therefore sales receipts from expanded publication begin to come back in bulk in 1949-50 the dangerous financial corner will have been rounded.

55. An adequate working reserve is, however, a necessity. It was long ago laid down that the minimum reserve should not fall below the equivalent of three to four months' expenditure.

56. (lxv) *Proposals for new Bureaux—Bureau of General Husbandry or Farm Systems. The conference is satisfied that information on this subject of value and use to departments and agricultural research institutes is not at present being covered and should be.* (*Paragraph 110.*)

(lxvi) *Most of the information required could, in the opinion of the conference, be provided by extensions of the duties of existing bureaux, and that course is preferable to the formation of a new bureau. The Executive Council should examine what information on agricultural machinery is available and, whether and if necessary, how it should be covered.* (*Paragraphs 111, 112, 113.*)

(lxvii) *The Executive Council is directed to examine the method of providing information on "general husbandry" within the framework of the existing bureaux ; the bureaux most affected are those of Pastures and Forage Crops, Soil Science and to a lesser extent Horticulture and Plantation Crops. The finance provided for the bureaux generally should cover the cost of this additional work. These conclusions are without prejudice to the possibility in the future of a Bureau of Agricultural Engineering. In the course of this development the name of the Bureau of Pastures and Forage Crops would be altered to Pastures and Field Crops.* (*Paragraphs 114, 115.*)

As indicated in the Preface arrangements were made for providing information on general husbandry in existing bureaux.

The information on agricultural machinery was investigated. Advice was taken from Mr. Cashmore, National Institute of Agricultural Engineering, and from Professor Kay, National Institute for Research in Dairying. There is certainly a specialised audience. But at present there are too few periodicals carrying suitable articles to make a journal of abstracts possible. It would be too small. It would appear that the time is not yet ripe to launch such a journal but the question might well be discussed further at the next Review Conference.

From the beginning of 1948 the new journal, Field Crop Abstracts, has been published. It is perhaps worth discussing this whole question of "general husbandry" again at the next Review Conference. There is undoubtedly an audience, a specialist and scientific audience, interested in general husbandry. It is a fact, as the last Review Conference report states, that the bureaux between them cover the subject pretty completely. But, as the Review Conference Report itself shows, it is covered by a combination of the journals "Soils and Fertilizers" "Herbage Abstracts," "Dairy Science Abstracts," "Veterinary Bulletin," "Horticultural Abstracts" and, now, "Field Crop Abstracts." It is unreasonable to expect anyone to read six abstract journals. There is perhaps room if not for a General Husbandry Bureau, at least for a journal, General Husbandry Abstracts, to collect the general husbandry items from all these six journals and print them together in one journal.

57. (lxviii) *Bureau of Agricultural Economics. The conference recommends that the Executive Council should arrange for the preparation of a memorandum outlining the desirable scope,*

organization and operation of an appropriate bureau, for submission to contributing governments, in order that they may secure opinions of qualified specialists on the desirability of establishing such a bureau and decide whether they are prepared to provide the necessary financial support. If, after consideration of the replies and a review of the relation of such a bureau to other organizations in existence, or contemplated in the near future, it is felt that such a bureau is needed, the conference agrees that the Executive Council take the necessary steps for its establishment. (*Paragraph 118.*)

The memorandum was still under preparation.

58. (lxix) *Bureau of Animal Ecology. The conference urges the need for further research into problems connected with Animal Ecology and recommends the Executive Council to cause a suitable memorandum to be prepared for circulation to contributing governments with the object of obtaining their views on the desirability of establishing a Bureau of Animal Ecology.* (*Paragraph 119.*)

The memorandum has been prepared. It awaits the completion of the memorandum under paragraph 57 above so that both can be submitted to Governments together. Both this memorandum and that under paragraph 57 above were submitted to Governments after the close of the year.

59. (lxx) *Fisheries Bureau. The conference wishes to record its interest in and support of the proposals on Oceanography and Fisheries adopted by the British Commonwealth Scientific Conference and is confident that the Executive Council will assist the Standing Committee of the British Commonwealth Scientific Conference in any way it is able.* (*Paragraphs 120, 121.*)

This matter has been taken up by the Standing Committee of the British Commonwealth Scientific Conference. Their attention was drawn to the fact that if a Fisheries Bureau were established for the British Commonwealth, the Standing Committee might consider the Executive Council of the Commonwealth Agricultural Bureaux an appropriate body to control it. So far no proposal has been made to the Executive Council. The question of a Fisheries Bureau is still under consideration by the Standing Committee of the British Commonwealth Scientific Conference.

60. (lxxi) *Bureau for the Statistical Interpretation of Data. The conference does not consider that such a bureau is needed.* (*Paragraph 122.*)

No action required.

61. (lxxii) *Plant Physiology. The conference considers this subject is adequately covered by the present bureaux.* (*Paragraph 123.*)

No action required.

62. (lxxiii) *Plant Expeditions and Collections. The conference emphasises the importance of systematic plant expeditions and the maintenance of plant collections as the basis for plant improvement and the development of agriculture throughout the Commonwealth and considers action on a Commonwealth basis needed.* (*Paragraph 124.*)

(lxxiv) *It accordingly recommends the setting up within the framework of the Imperial Agricultural Bureaux of an organization to receive all information about such expeditions, to render all assistance, and to review the position as regards the maintenance of collections and make proposals. This organization should be assisted by a Special Scientific Committee with a qualified Secretary.* (*Paragraph 125.*)

A temporary Plant Expedition Committee has been set up. Nothing has yet been done towards a general review of the position regarding the maintenance of collections. Just after the close of the year a further step forward was made by F.A.O. with the co-operation of C.A.B., by setting up machinery to produce a world catalogue of genetic stocks for wheat. (See App. I.)

63. (lxxv) *The assistance of Botanic Gardens and other permanent organizations in the Commonwealth in the maintenance of collections of economic importance should be sought; and governments be requested to take such steps as may be practicable to explore their indigenous flora and to maintain collections of plants of possible economic value.* (*Paragraphs 126, 127.*)

The attention of Governments has been drawn to this but see paragraph 62 above which affects this item.

64. (lxxvi) *List of Agricultural and Forestry Research Workers. The conference recommends that the compilation and publication of this list, the issue of which was suspended during the war should be resumed. Its general usefulness is widely acknowledged.* (*Paragraph 128.*)

The conference recommends the adoption of certain modifications of detail. (*Paragraphs 129, 130.*)

The list was issued just after the close of the year. It must contain many errors but a revision will be undertaken almost immediately.

65. (lxxvii) *Relations with F.A.O. The conference welcomes the establishment of relations with the F.A.O. and notes with approval the report of the meeting held in April, 1946. It desires the Executive Council to keep governments and Liaison Officers promptly informed of any developments in its relations with the F.A.O. and with other organizations of the United Nations such as U.N.E.S.C.O., if and as these occur.* (*Paragraph 133.*)

See paragraphs 67 to 73 for action under this.

66. (lxxviii) *Specialist Conferences. The conference—*

(a) *reaffirms the findings of the 1936 Review Conference of the value of specialist conferences, on the need for co-ordinating the dates if their meetings with those of other conferences requiring the attendance of similar specialists and on the desirability of providing advance notice and information—even where possible to the provision of tentative programmes up to three years ahead ;*

(b) *expects the Executive Council to work in close collaboration with the Standing Committee of the British Commonwealth Scientific Conference in this, as in other matters ;*

(c) *takes note of the Empire Forestry Conference planned for 1947 and recommends the early resumption of the Imperial Entomological and Mycological Conferences.*

In addition to the Entomological and Mycological Conferences, a Tropical Soils Conference and informal meetings on Animal Genetics and Plant Genetics have been arranged for the summer of 1948.

FOOD AND AGRICULTURE ORGANIZATION

67. Relations with F.A.O. continue to be cordial. With two bodies covering such similar general fields the risk of duplication of effort is always present and can only be prevented by close liaison and by each knowing what the other is doing. Such an overlap might have occurred over the proposed F.A.O. catalogue of Superior Breeding Stocks. However, towards the close of the year, F.A.O. arranged a meeting in Washington of representatives of F.A.O., the Bureau of Plant Industry of the United States Department of Agriculture, the National Central States Association of Experiment Stations, the United States National Research Council, the Canadian Department of Agriculture and C.A.B. This meeting formulated a programme of work for F.A.O. with the object of defining the sphere of F.A.O. and avoiding unnecessary overlap with other bodies. Though the meeting actually took place just after the close of the year its report is given in Appendix I.

68. Further steps towards closer co-operation taken towards the close of the year or immediately after its close were that F.A.O. should consider C.A.B. as "an inter-governmental organization working in the same field as F.A.O. and should invite C.A.B. to be represented as an observer at annual sessions of the F.A.O. conference as well as at technical meetings concerned with subjects of common interest." At the same time C.A.B. agreed to send an invitation to F.A.O. to send observers to any specialist conference which C.A.B. might arrange and in which F.A.O. might be interested. Before the close of the year F.A.O. was invited to send representatives to the specialist conferences or meetings on Entomology, Mycology, Tropical Soils, Plant Breeding and Genetics and Animal Breeding and Genetics which C.A.B. were arranging during the summer of 1948.

69. To avoid possible duplication in publications it was agreed that C.A.B. should send F.A.O. its list of publications proposed or in hand whenever the list was revised, about every six months, while F.A.O. would send its list of forecasted publications at the time of the preparation of the annual budget. Naturally such lists can only be an approximate forecast liable to revision.

70. It was also arranged that a member of the F.A.O. staff should be designated for each bureau with whom the Director of the Bureau should correspond. The Secretary to the Executive Council would address correspondence to the Deputy Director-General of F.A.O.

71. During the general discussions on publications it seemed apparent that the two organizations were catering for different classes of readers. While C.A.B. caters mostly for the specialist scientist and research worker, F.A.O. appears to cater neither for the specialist scientist and research worker nor so much for the purely practical grower of crops but more for Governments and administrators who have to initiate a policy for action in various countries. Thus an apparent overlap in the title of a publication may not be real duplication of work in the reading matter.

72. Dr. Leitch, Director of the Bureau of Animal Nutrition, continued to be a member of the F.A.O. Standing Committee on Nutrition. Sir Herbert Howard has been appointed a member of the U.K. National F.A.O. Consultative Committee.

73. The following conferences or meetings, organized by the Food and Agricultural Organization, were attended by members of the staff of C.A.B.

U.K. National F.A.O. Consultative Committee—Sir Herbert Howard.

Conference on Infestation of Stored Products (London)—Dr. Hall and Dr. Evans (representing Australia) of the Institute of Entomology, Dr. Wiltshire of the Mycological Institute and Dr. Leitch of the Bureau of Animal Nutrition.

F.A.O. International Course on Hybrid Maize —Birgamo—Dr. Hudson of the Bureau of Plant Breeding and Genetics as an official instructor.

F.A.O. Committee on Plant Breeding—(Washington)—Dr. Leitch because she happened to be there for a nutrition meeting.

F.A.O. Standing Advisory Committee on Nutrition (Geneva)—Dr. Leitch.

Certain extracts from F.A.O. publications are reproduced as Appendix I to this report.

SPECIALIST CONFERENCES

74. Although the specialist conferences arranged for the summer of 1948 are mentioned under the action taken on the resolutions of the Review Conference of 1946, they may perhaps be repeated here for convenience though all actually took place after the close of the year:

The Fifth Commonwealth Entomological Conference.

The Fourth Commonwealth Mycological Conference.

The Commonwealth Tropical Soils Conference.

Two informal meetings are also to be held of:—

Commonwealth Plant Breeders and Geneticists.

Commonwealth Animal Breeders and Geneticists.

CHANGES IN PERSONNEL IN THE EXECUTIVE COUNCIL AND IN THE INSTITUTES AND BUREAUX

75. The following changes occurred in the Executive Council. In May, 1947, Mr. F. L. McDougall, C.M.G., the representative of Australia resigned from the Executive Council and Mr. N. E. Holmes, B.E.Eng., M.M.Eng., who had represented Australia since February, 1947, was appointed permanent Member in his place.

In September, Mr. M. K. Vellodi, C.I.E., I.C.S., the representative of India, resigned from the Executive Council and shortly afterwards Mr. R. S. Mani, I.C.S., was appointed Member in his place. Mr. W. B. England, M.B.E., deputised for Mr. Vellodi and Mr. Mani during the year.

In October, Captain I. H. Morten, R.N., who had deputised for Mr. T. G. Gisborne, the representative of Southern Rhodesia, ceased to do so, and Mr. A. V. Hubbard, was appointed to succeed Mr. T. G. Gisborne as Member of Council representing Southern Rhodesia.

In December, Dr. E. Marsden, C.M.G., C.B.E., M.C., F.R.S., was appointed representative of New Zealand. Mr. G. A. Holmes, M.Sc., B.Agric., who had deputised for the representative of New Zealand since November, 1946, was nominated as alternate Member.

Mr. B. O. Binns, O.B.E., I.C.S., resigned from the Executive Council as the representative of Burma.

In January, Pir Zade V. Inayat Khan was appointed to deputise for the High Commissioner for Pakistan, the representative of Pakistan.

The Executive Council regrets to have to report that in December, 1947, the news was received of the death of Sir Robert Blyth Greig, M.C., LL.D., D.Sc., who was the representative of Scotland and Chairman of the Executive Council from its inception in 1929 till July, 1931.

76. Changes also occurred among senior officers in the Institutes and Bureaux. The staff of entomologists at the Institute of Entomology was augmented by the appointment of Mr. D. J. Atkinson, O.B.E. and Mr. G. J. Kerrich, M.A.

In April, Prof. C. H. Waddington, M.A., Sc.D., F.R.S., Head of the Department of Genetics,

Edinburgh University, was appointed Consultant Director of the Bureau of Animal Breeding and Genetics, Edinburgh, at the same bureau, Later in the year, Mr. J. P. Maule, M.A., A.I.C.T.A., was appointed Director, and Mr. I. L. Mason, B.A., who had been acting as Director, was promoted from Scientific Assistant to Assistant Director.

In September at the Forestry Bureau Dr. C. F. C. Beeson, C.I.E., resigned from the post of Acting Director after Mr. F. C. Ford Robertson, B.Sc., lately of the Indian Forest Service had been appointed Director. Later in the year Mr. P. G. Beak was promoted from Scientific Assistant to Assistant Director of this bureau.

In addition to the above, two more appointments to Assistant Director, were made.

Mr. A. G. G. Hill, B.A., B.Agric., A.R.C.Sc.I., formerly Director, East African Agricultural Research Station, Amani, joined the Bureau of Horticulture and Plantation Crops, and Miss E. M. Smedley, M.Sc., was transferred on promotion from the Bureau of Animal Health, Weybridge, to the Bureau of Agricultural Parasitology.

At the Bureau of Biological Control, Belleville, Canada, two entomologists were appointed—Mr. G. C. Ullyett, B.Sc., M.D., and Dr. L. Mesnil the well-known authority on parasitic diptera. The former was stationed at Bermuda on the cedar scale project and the latter in Switzerland on the spruce budworm project.

OVERSEAS VISITS BY SENIOR STAFF

77. In May, Mr. G. V. Jacks, Director of the Bureau of Soil Science attended the International Congress of Pedology in France and Algeria. Dr. I. Leitch, Director of the Bureau of Animal Nutrition, who had attended a F.A.O. meeting in Washington—as mentioned in the 18th Annual Report—went on to Canada where she toured for about a month. In September she visited Geneva to attend the F.A.O. Standing Advisory Committee on Nutrition. Miss F. C. Russell, scientific assistant at the Bureau of Animal Nutrition who, as reported in the 18th Annual Report, was seconded to the Department of Public Health and Welfare, Newfoundland to initiate a nutrition programme returned to the bureau in September.

In July, Dr. R. O. Whyte, Director of the Bureau of Pastures and Field Crops visited Norway, Sweden, Finland and Denmark to attend a combined meeting of the Finnish, Swedish and British Grassland Societies.

Mr. D. Akenhead, Director of the Bureau of Horticulture and Plantation Crops visited the Research Institute, Wadenswil, Switzerland to establish liaison with Swiss horticulture.

In October, Mr. I. L. Mason, Acting Director of the Bureau of Animal Breeding and Genetics visited Zurich to attend the International Meeting on Animal Production sponsored by the Swiss Zootechnical Society.

In February, Dr. Bisby visited Malta in connection with the mycological survey of the island.

All expenses for Dr. Leitch's visits to Washington and Geneva were borne by F.A.O. while the expenses of her visit to Canada were borne by the Canadian Government.

VISITS TO BUREAUX BY OVERSEAS SCIENTISTS

78. In the 18th Annual Report mention was made of two officers of the Government of India on deputation to the Bureau of Animal Nutrition. Dr. G. Sankaran left for America in April and Dr. K. Mitra left in October. In September a third officer, Dr. S. N. Ray, arrived, and left in November.

In December, Mr. A. B. Cashmore, a senior officer of the Division of Plant Industry, Australia, arrived in this country and made an extended visit—lasting six weeks—to all the institutes and bureaux. He spent two or three days at each centre studying bureau procedure. This will be of great service now that Mr. Cashmore has returned to Australia, where he is part of the Information Service of the Commonwealth Council for Scientific and Industrial Research. Since the close of the year he has been appointed Liaison Officer for the bureaux in Australia.

There have been numerous other visitors from many Commonwealth and foreign countries both to headquarters and to the individual bureaux. From foreign countries visitors have come from China, France, Hungary, Iceland, Java, Mexico and the United States of America.

PUBLICATIONS

79. The first number of the new Abstract Journal—Field Crop Abstracts—was issued just before the close of the year. The total number of regularly issued Abstract Journals is now 14 and the addition of this new journal increases the quota copies to each country by one volume for each unit of contribution. Thus the United Kingdom with 40 units of contributions now receives 560 volumes instead of the former 520 volumes.

The Paper Control has continued to treat the institutes and bureaux most considerately and, though the curtailed wartime issues have necessitated the reproduction of some parts and will necessitate the reproduction of others, there has been sufficient paper to print the requisite numbers of all publications issued during the year.

80. The usual statement of the receipts from sales of publications over a seven-year period is as follows:—

RECEIPTS FROM SALES OF PUBLICATIONS

	1941–42	1942–43	1943–44	1944–45	1945–46	1946–47	1947–48
	£	£	£	£	£	£	£
Commonwealth Institute of Entomology ...	1,885	1,692	2,236	2,811	4,018	5,069	5,884
Commonwealth Mycological Institute ...	843	799	1,333	1,616	2,166	2,802	3,030
The Bureaux, including Nutrition Abstracts and Reviews	6,443	5,468	6,607	8,750	11,305	14,874	15,678
	9,171	7,959	10,176	13,177	17,489	22,745	24,592

The figures for the several bureaux are:—

	1941–42	1942–43	1943–44	1944–45	1945–46	1946–47	1947–48
	£	£	£	£	£	£	£
Agricultural Parasitology (Helminthology)	198	236	247	329	318	570	645
Animal Breeding and Genetics	188	232	305	528	874	901	1,059
Animal Health	1,174	1,219	1,474	1,688	2,291	3,172	2,776
Animal Nutrition	50	45	33	82	131	113	96
Dairy Science	270	300	323	378	636	708	642
Forestry	237	229	236	270	444	726	1,041
Horticulture and Plantation Crops ...	417	308	412	794	887	1,245	1,533
Pastures and Field Crops	348	250	336	688	1,032	1,132	1,353
Plant Breeding and Genetics	334	240	342	531	686	1,178	1,323
Soil Science	399	308	372	471	661	1,482	1,516
Headquarters...	16	7	5	13	11	13	2
Total	3,631	3,374	4,090	5,772	7,971	11,240	11,980
Nutrition Abstracts and Reviews	2,057	2,098	2,501	2,951	3,318	3,606	3,655
5-year Index	755	4	16	27	16	28	37
	6,443	5,468	6,607	8,750	11,305	14,874	15,678

With the exception of the year 1942-43 this table shows a progressive increase of receipts from sales. The figure shown in the third column, that for 1943-44 (£10,176) is higher than for any pre-war year and the steady increase since that year is due to the general increased demand for the publications of both institutes and all the bureaux. A decrease in an individual bureau in an individual year is not necessarily important as it may be due merely to the date of the actual receipt of payments.

It will be noticed that the receipts for 1947-48, £24,592, are nearly 2½ times those of 1943-44, £10,176, which itself was a record at that time.

81. The above figures relate to sales and audited receipts and take no account of copies distributed free. Journals to the value of £3,292 are sent under the quota system free to Commonwealth countries. Journals to the value of £547

are sent free as exchanges to Commonwealth countries and to the value of £1,054 to foreign countries.

In the spring of 1948 the numbers on the regular mailing list for the journals was as follows:—

	Numbers		Subscribers	Total
	Free "Quota"	Free, almost entirely exchange		
Countries of the British Commonwealth and Anglo-Egyptian Sudan	2,376	373	4,610	7,359
Foreign Countries	—	749	4,460	5,209
Total	2,376	1,122	9,070	12,568

Despite the encouraging increase of sales the Executive Council still do not believe that the journals and other publications reach as wide a circle of readers as the usefulness of the publications would justify. It may be that in some countries the demand for some journals is approaching saturation point but, taking all journals and countries together, the Executive Council still believes there is scope for considerable increase in sales.

The cost of the publications may have something to do with this. The cost of the journals had continued at the pre-war figure. The 1946 Review Conference report, para. 33, recommended a revision of prices to something more in accord with the greatly increased costs of printing. During the year the Executive Council raised the prices of the journals.

The 1946 Review Conference report also recommended the Executive Council to consider the possibility of a special discount to contributing Governments. During the year the Executive Council was able to offer such a special discount to contributing Governments for certain journals.

They have not yet been able to offer any departmental concession rate for the Bulletin of Entomological Research, Index Veterinarius, Nutrition Abstracts and Reviews and the separately reprinted section 3 of Forestry Abstracts called Forest Products and Utilization. For the rest they have offered a departmental concession rate which in effect means that the supply is continued at pre-war rates. For the Review of Applied Entomology Series A and B and the Review of Applied Mycology this departmental concession rate is unconditional; for the other journals it is conditional on Governments ordering a certain minimum number of volumes, the Governments being at liberty to select the numbers of each journal to make up the total number ordered.

The list below gives, for all the journals, the standard price, the Empire rate and the departmental concession rate.

	Price	Empire Rate	Departmental Concession Rate
	s.	s.	s.
Review of Applied Entomology Series A	40	40	25
,, ,, ,, Series B	20	20	15
Bulletin of Entomological Research	40	40	None
Review of Applied Mycology	40	32	25
Helminthological Abstracts	35	35	20
Index Veterinarius	100	100	None
Veterinary Bulletin	40	40	25
Nutrition Abstracts and Reviews	60	60	None
Forestry Abstracts	45	36	30
Forest Products and Utilization	15	15	None
Animal Breeding Abstracts Dairy Science Abstracts Horticultural Abstracts Herbage Abstracts Plant Breeding Abstracts Soils and Fertilizers.	35	28	20

Although the new publication, Field Crop Abstracts, has appeared during this period, it was not actually distributed until the period was over. Its price is 35s. with Empire Rate 28s. The question of a departmental concession rate for this publication will be examined.

While the Executive Council has only offered these special rates to contributing countries they wish to emphasise that the best way to bring down prices is to increase circulation. The Executive Council would be prepared to consider special discounts for sufficiently large orders from other than Commonwealth countries.

82. Only six Technical Communications were issued by the bureaux during the year. The number is misleading because at least three others were nearing completion and were published very soon after the close of the year.

LIST OF TECHNICAL COMMUNICATIONS, ETC., ISSUED 1947-48

	Issued by the Bureau of—
1. "Phenothiazine, 1942–46". A Review and Bibliography. Joint No. 12.	Animal Health and Agricultural Parasitology. (Jointly).
2. "The Use and Misuse of Shrubs and Trees as Fodder". Joint No. 10.	Forestry, Pastures and Field Crops and Animal Nutrition. (Jointly).
3. "The use of Aerial Survey in Forestry and Agriculture". Joint No. 9.	Forestry and Pastures and Field Crops. (Jointly).
4. "Chemical Composition of Plants as an index of their Nutritional Status". No. 17.	Horticulture and Plantation Crops.
5. "Advances in Grassland Husbandry and Fodder Production, Second Symposium". Bulletin 38.	Pastures and Field Crops.
6. "Five hundred varieties of Herbage and Fodder Plants". Bulletin 39.	Pastures and Field Crops.

In addition the List of Research Workers Agriculture and Forestry, last issued in 1939, was reissued, being the list as it stood at the beginning of 1947. With such a long interval it proved to be a much more formidable task than was anticipated. The publication contains far more errors than is desirable but the Executive Council felt that for this particular edition speed of production was more important than meticulous accuracy. Conditions have not yet settled after the war and changes are still frequent. It is hoped, however, to produce another more accurate edition early in 1950 after which the list should show only the normal number of changes. The Executive Council will be grateful if any errors can be brought to their notice.

83. The list above refers only to occasional publications issued by the bureaux. Besides these of course, in addition to their regular periodicals, the Mycological Institute issued the following five Mycological papers.

Mycological Papers

No. 19. A. S. Boughey—"The Effect of Rainfall on Plant Disease Distribution in the Anglo-Egyptian Sudan."

No. 20. S. P. Wiltshire—"Species of Alternaria on Brassicae."

No. 21. A. S. Boughey—"The Cause of Variation in the Incidence of Blackarm Disease of Cotton in the Sudan Gezira."

No. 22. A. S. Boughey—"The Causes of Variation in the Incidence of Cotton Leaf Curl in the Sudan Gezira."

No. 23. C. G. Hansford and F. C. Deighton —"West African Meliolineae," "II. Meliolineae collected by F. C. Deighton, March, 1948."

The Bureau of Biological Control published part 9 of the Parasite Catalogue.

THE COMMONWEALTH INSTITUTE OF ENTOMOLOGY

84. The Director's report is printed as Appendix II. The number of subscribers and the total receipts from sales continue to increase. For the Review of Applied Entomology, Series A, the number was 860 against 837 in 1946, Series B, 739 against 696. For the Bulletin of Entomological Research it was 572 against 520 in 1946.

85. The total receipts from all sales, including the sale of back numbers, rose to just over £5,884 compared with £5,069 in the previous year, an increase of £815.

86. The number of specimens received for identification was 41,536 as compared with 64,144 in the previous year, a decrease of 22,608 or about

35 per cent. These insects were received from 160 different correspondents, compared with 142 of the previous year, received as follows, Africa 55, Asia 19, America 17, Oceania 14 and Europe 55. The list of identifications sent out were 318 comprising 7,217 names compared with 300 and 6,254 in the previous year. These identifications were despatched to Africa 4,581, America 313, Asia 1,074, Oceania 855 and Europe 394.

87. The number of insects handed over to the British Museum was 18,722, compared with 17,325 in the previous year, of which 147 were types of species new to science and among the remainder 395 named species not previously represented in the National Collection. A number of specimens were also presented to the London School of Hygiene and Tropical Medicine, the Massachusetts State College and Dr. Ewen Cameron.

88. The Library continued to expand. Accessions were 350 bound volumes and 1,227 pamphlets making a total of 11,829 volumes and 33,633 pamphlets. Like so many libraries it is hampered for lack of space though this difficult problem receives continual attention.

THE COMMONWEALTH MYCOLOGICAL INSTITUTE

89. The Director's report is published as Appendix III. The work of the Institute is increasing considerably and the lack of accommodation is now definitely impeding it. The solution of the accommodation problem is difficult. Governments cannot be asked to sanction large capital expenditure for building without proper plans and estimates. Plans and estimates cannot be drawn up exactly with no site for the building. A site has not yet been obtained. A site could have been bought but it would have greatly increased the total cost which in any case is likely to exceed the £25,000 suggested in paragraph 109 of the Review Conference Report, 1946. All Council can do is to continue to explore all channels.

90. An important development during the year was the starting of a culture collection. Details are given in the report. What may be mentioned here is that though much of the work is of Commonwealth importance and though the Mycological Institute is the most suitable place for the whole collection, part of the collection is in fact the National collection and, if the Commonwealth Mycological Institute were stationed elsewhere than the United Kingdom, this part of the collection would have to be maintained and paid for locally. Arrangements are being made for a special grant from the United Kingdom for this part of the work.

91. The number of subscribers has increased to 867, an increase of 36 over the previous year. Receipts for the journal have, however, decreased from approximately £2,553 to approximately £2,364. This is owing to the falling off of demand for the back war time volumes.

The total receipts from sales were approximately £3,030 against approximately £2,802 for the previous year so that, though the journal receipts alone have fallen, the total receipts are still rising.

The volumes of the Review of Applied Mycology which were out of print have now been microfilmed.

92. The number of subscribers to the supplements rose to 154 compared with 146 in the previous year. The Annotated Bibliography of Medical Mycology for 1946, prepared in conjunction with the Bureau of Hygiene and Tropical diseases, was published during the year. Five further Mycological papers were issued during the year already listed in paragraph 83. Three mimeographed publications also were issued during the year. During the year a mimeographed list of the 149 translations filed in the library was issued to plant pathologists throughout the Commonwealth. Books and reprints were lent as usual.

THE COMMONWEALTH BUREAU OF BIOLOGICAL CONTROL

93. The annual reports of 1945-46 and 1946-47, not received in time for the main 1946-47 report, has since been issued as a supplement to that report. The 1947-48 report has been received in time to incorporate it in this report. It is hoped in future to include the report of this bureau with the general report. The audited accounts of this bureau, however, are still one year behind the others. It is hoped to speed matters up so that the accounts also will be up to date.

94. During the year the bureau was at work on special projects from Antigua, Australia, Barbados, Bermuda, Canada, Grenada, Italy, Mauritius, New Zealand, Palestine and the Union of South Africa.

It is regrettable that three New Zealand projects had to be abandoned because they could not be financed owing to dollar shortage though, at any rate for the Wheat-Stem Weevil, the parasites are not of much importance as controlling agents in their native home in South America.

The spruce budworm project and the Bermuda Cedar Scales project, both referred to in last Year's report, have not yet yielded any very definite results. At the close of the year everything was ready for more intensive development of work on the spruce budworm project though the bureau has never held out any very great hopes of success. The progress on the Bermuda Cedar Scales has been difficult to interpret and up to now disappointing. Further work is necessary.

95. As already reported in paragraph 83, part 9 of the Parasite Catalogue was published during the year. Five hundred and ninety-six volumes were issued including those distributed free.

THE COMMONWEALTH POTATO COLLECTION

96. The report of the Potato Collection is by the calendar year. In previous years the annual report for the year has included the potato report for the calendar year which finished 9 months later. Thus the last annual report for 1946-47 included the Commonwealth Potato Collection report up to the end of the calendar year 1947. But as the 1947-48 report has been speeded up a little (and it is hoped that later reports will be speeded up considerably more) the calendar year 1948 is not yet over and the potato report not written. The 1948 potato report will be incorporated in the 1948-49 general report.

FINANCE

(EXCLUDING THE COMMONWEALTH POTATO COLLECTION)

97. The Comptroller and Auditor General has audited the accounts of the institutes and bureaux for the year 1947-48, and those of the Bureau of Biological Control (Parasite Service) for 1946-47. These accounts are attached to this report. The position on 31st March, 1948, was as follows:—

	Normal contributions due in 1947–48	Outstanding on 31.3.47 para. 52 of Report 1946–47	Total due	Received in 1946–47 in advance for 1947–48	Outstanding on 31.3.48	Total received in 1947–48
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Commonwealth Institute of Entomology ...	20,442 12 6	1,508 17 9	21,951 10 3	350 0 0	1,303 15 11	20,297 14 4
Commonwealth Mycological Institute	12,567 3 9	988 16 9	13,556 0 6	275 0 0	820 14 2	12,460 6 4
The Bureaux	71,894 10 0	2,192 13 6	74,087 3 6	265 18 4	2,568 10 1	71,252 15 1

The figures £71,252 15s. 1d. in the last column for the bureaux agree with those in the Auditor General's statement.

The bureaux arrears of contributions outstanding on 31st March, 1948, were £2,568 10s. 1d. made up as follows:—

	£	s.	d.
Bahamas	67	18	3
British North Borneo ...	74	16	10
Burma	556	10	0
Falkland Isles	9	0	0
Leeward Isles	39	0	0
India and Pakistan ...	1,821	5	0
	£2,568	10	1

Of this amount, £39 has since been received from the Leeward Isles and £9 from the Falkland Islands. The amount of £74 16s. 10d. from British North Borneo has been written off by the Executive Council.

The large amount outstanding against India and Pakistan needs explanation. The contribution due from prepartition India was £6,678. The exact date and method of division of this sum had not been finally settled between the two dominions at the close of the year. India (after partition) had paid £4,856 15s. 0d. before the close of the year and the remaining £1,821 5s. 0d. will presumably be paid as soon as the two Dominions have agreed upon the final allocation.

The figures, £20,297 14s. 4d., in the last column for the Institute of Entomology exceed by £2,252 16s. 7d. the figure shown in the Auditor-General's statement, viz., £18,044 17s. 9d. The excess is made up of payments which had been received in this office, but not cleared at the bank on the close of the year.

The arrears outstanding on 31st March, 1948, are made up of—

	£	s.	d.
Australia	569	13	5
Bahamas	50	—	—
Burma	160	2	6
India and Pakistan ...	524	—	—
	£1,303	15	11

Of the arrears the sum of £569 13s. 5d. has since been received from Australia.

The explanation of the India and Pakistan outstanding is the same as that given above for the bureaux. A payment of £1,397 10s. 0d. by India (after partition) was received in this office before the close of the year and the remaining £524 will presumably be paid as soon as the two Dominions have agreed upon the final allocation.

The figures, £12,460 6s. 4d., in the last column for the Mycological Institute exceed by £1,445 19s. 7d. the figures shown in the Auditor-General's statement, viz., £11,014 6s. 9d. The excess is made up of payments which had been received in the office, but not cleared at the bank on the close of the year.

The arrears outstanding on 31st March, 1948, are made up of—

	£	s.	d.
Australia	350	0	5
Bahamas	50	0	0
Burma	98	8	9
India and Pakistan ...	322	5	0
	£820	14	2

Of this amount the sum of £350 0s. 5d. has since been received from Australia.

The explanation of the India and Pakistan outstanding is the same as that given above for the bureaux. A payment of £859 by India (after partition) was received in this office before the close of the year and the remaining £322 5s. 0d. will presumably be paid as soon as the two Dominions have agreed upon the final allocation.

98. The audited statement for the Bureau of Biological Control (Parasite Service) attached to this report relates to the year 1946-47. The position as regards contributions from governments was as follows:—

	£	s.	d.
Normal amount due in the year	5,075	0	0
Add arrears outstanding on 31st March, 1946	7	4	11
Amount expected in the year	5,082	4	11
Deduct arrears outstanding on 31st March, 1947	78	11	6
	5,003	13	5
Add amount received in 1946-47 in advance for 1947-48	12	1	6
Contributions received in the year	5,015	15	11

This amount exceeds by £208 10s. 4d. the figures shown in the Auditor-General's statement. The excess is made up of payments which had been received in the office, but not cleared at the bank on the close of the year. They will appear in the audited account for 1947-48.

The arrears outstanding on 31st March, 1947, are made up of—

	£	s.	d.
Bahamas	3	1	9
British North Borneo—			
1944-45	2	1	7
1945-46	2	1	7
1946-47	2	1	7
Hong Kong	11	13	6
Malay States	57	11	6
	£78	11	6

Of this amount, the contributions from British North Borneo for the years 1944-45 and 1945-46 (£4 3s. 2d.) have been written off by the Executive Council, that for 1946-47 (£2 1s. 7d.) has since been paid. Also, the contributions of £57 11s. 6d. from the Malay States and £11 13s. 6d. from Hong Kong have since been paid.

The accounts for the Bureau of Biological Control for 1947-48 have not been audited but all

payments due in the year have been received except—

£3 1s. 9d. from the Bahamas for 1946-47.
£98 8s. 9d. from Burma.
£322 5s. 0d. from India and Pakistan.

The explanation of the India and Pakistan outstanding is the same as that given for the bureaux.

A payment of £859 by India (after partition) was received in this office before the close of the year and the remaining £322 5s. 0d. will presumably be paid as soon as the two Dominions have agreed upon the final allocation.

P. R. LAIRD,
Chairman.

THE EXECUTIVE COUNCIL OF THE COMMONWEALTH AGRICULTURAL BUREAUX

Account of Receipts and Payments for the Year ended 31st March, 1948.

RECEIPTS

	£ s. d.	£ s. d.	£ s. d.
*Balance on 1st April, 1947 ...			12,191 3 5
Contributions from Commonwealth Governments:			
Commonwealth Agricultural Bureaux	71,252 15 1		
Various Institutes	41,491 6 1		
		112,744 1 2	
Less: Paid over		36,763 10 0	
			75,980 11 2
Potato Expedition Fund			8,525 15 0
Contributions towards cost of Headquarters			1,610 0 0
Micellaneous Receipts :—			
Interest and Dividends	207 18 8		
Translation Fees, etc.	5 19 0		213 17 8
			£98,521 7 3

*Includes sums held on behalf of:—

Potato Expedition Fund ...	£5,984 10 3
Journal of Dairy Research ...	107 14 9

PAYMENTS

	Expenditure £ s. d.	Less Receipts for Sale of Publications, etc. £ s. d.	Net Expenditure £ s. d.
Expenditure incurred by the Commonwealth Bureau of :—			
Soil Science (Rothamsted) ...	5,456 9 2	1,522 8 11	3,934 0 3
Animal Health (Weybridge) ...	8,311 3 4	2,782 13 1	5,528 10 3
Animal Nutrition (Aberdeen) ...	5,338 16 4	98 4 4	5,240 12 0
Animal Breeding and Genetics (Edinburgh)	4,590 8 9	1,060 2 3	3,530 6 6
Pastures and Field Crops (Aberystwyth)	6,915 9 0	1,356 4 11	5,559 4 1
Plant Breeding and Genetics (Cambridge)	5,947 2 4	1,332 2 11	4,614 19 5
Horticulture and Plantation Crops (East Malling)	6,255 9 2	1,536 12 0	4,718 17 2
Agricultural Parasitology (St. Albans)	3,120 13 5	645 17 6	2,474 15 11
Dairy Science (Shinfield)	4,708 13 1	643 5 3	4,065 7 10
Forestry (Oxford)	6,381 10 8	1,042 19 7	5,338 11 1
Secretariat	7,977 0 7	8 15 3	7,968 5 4
Accessions Branch	299 15 4		299 15 4
Central Sales Branch	2,880 12 8		2,880 12 8
	68,183 3 10	12,029 6 0	56,153 17 10
Journal of Dairy Research ...			83 14 9
Potato Expedition Fund			6,899 13 7
Balance on 31st March, 1948.			
H.M. Paymaster General	26,831 9 0		
Less: Outstanding Orders ...	3,671 4 9		
		23,160 4 3	
Add: Sub-Accountants and Deposit Accounts		311 5 8	
Post Office Savings Bank ...		11,912 11 2	
			35,384 1 1*
			£98,521 7 3

Investments at 31st March, 1948.

£2,000 4% Commonwealth of Australia Registered Stock1 955/70 at cost £1,940 4 0

*Includes sums held on behalf of:—

Potato Expedition Fund ...	£7,610 11 8
Journal of Dairy Research ...	24 0 0

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify, as the result of my audit, that in my opinion the above Account is correct.

(Signed) F. N. TRIBE,
Comptroller and Auditor General.

(Signed) E. J. ALLIES,
Accountant to Council.

(Signed) S. HOWARD,
Secretary.

Executive Council,
Commonwealth Agricultural Bureaux.
31st August, 1948.

COMMONWEALTH INSTITUTE OF ENTOMOLOGY

Account of Receipts and Payments for the period 1st April, 1947 to 31st March, 1948.

RECEIPTS

	£ s. d.	Amount £ s. d.
Balance on 1st April, 1947 ...		10,138 11 7
Contributions from :—		
Commonwealth Governments	18,044 17 9	
Foreign Governments	319 0 0	
Societies	250 0 0	
		18,613 17 9
Interest and Dividends		460 18 6
Sales of Publications		5,884 3 11
		£35,097 11 9

PAYMENTS

	£ s. d.	Amount £ s. d.
Salaries :		
Directors		2,840 0 0
F.S.S.U. Contributions		284 0 0
Scientific staff		8,630 1 1
F.S.S.U. Contributions		809 10 8
Librarians, Clerical Staff, etc.		3,958 16 4
F.S.S.U. Contributions		345 11 4
National Insurance		93 8 3
Travelling Expenses		14 1 6
Library : Books, Publications, Binding, etc.		216 15 4
Bulletins		3,568 13 3
Stationery, Postages, Telephones, etc.		262 4 4
Rent, Rates, Insurance		380 1 6
Housekeeping, Light, Heat, Water, Cleaning, etc.		335 13 10
Laboratory Equipment		205 2 5
Contingencies		4 0 0
Audit Fee and Contribution to Headquarters		470 0 0
Fifth Entomological Conference		6 11 11
		22,424 11 9
Balance on 31st March, 1948.	£ s. d.	
Joint Colonial Fund	12,000 0 0	
Crown Agents for the Colonies	381 5 6	
Dr. W. J. Hall	16 3 11	
	12,397 9 5	
Add: F.S.S.U. Suspense	275 10 7	
		12,673 0 0
		£35,097 11 9

Investments on 31st March, 1948.

£ s. d.				£ s. d.
1,000 0 0	Cyprus	4% Stock	1956/66 at cost ...	950 0 0
2,679 19 0	Funding	4% „	1960/90 „ „ ...	1,869 12 6
1,000 0 0	Jamaica	4% „	1952/62 „ „ ...	940 0 0
1,017 16 8	Kenya	4½% „	1961/71 „ „ ...	998 15 0
1,004 19 11	Savings Bonds	3% „	1955/65 „ „ ...	1,072 16 8
1,000 0 0	Nigeria	4% „	1963 „ „ ...	881 7 0
951 1 10	Savings Bonds	3% „	1960/70 „ „ ...	1,040 5 2
£8,653 17 5				£7,752 16 4

(Signed) E. J. ALLIES
Accountant to Council.

(Signed) W. J. HALL
Director.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify as the result of my audit, that in my opinion the above Account is correct.

(Signed) F. N. TRIBE,
Comptroller and Auditor General.

(Signed) S. HOWARD,
Secretary.
Executive Council, Commonwealth Agricultural Bureaux.
27th July, 1948.

COMMONWEALTH MYCOLOGICAL INSTITUTE

Account of Receipts and Expenditure for the year ended 31st March, 1948.

RECEIPTS

	£	s.	d.
Balance on 1st April, 1947	7,831	17	0
Contributions—			
Commonwealth Governments	11,014	6	9
Sudan	275	0	0
Societies	150	0	0
Dividends and Interest	156	0	11
Sale of Publications	3,030	3	6
Grant from Bureau of Hygiene and Tropical Medicine	30	0	0
Donation to Library		10	6
	£22,487	18	8

PAYMENTS

	£	s.	d.
Director's salary	1,520	0	0
Superannuation	152	0	0
Scientific and Technical Staff salaries	6,230	19	11
Superannuation	553	6	0
Clerical Staff, Salaries	1,510	19	4
Superannuation	110	17	0
Laboratory Attendant	311	17	0
Superannuation	26	16	0
Part-time and Overtime	25	9	9
National Insurance	72	9	9
Travelling	61	18	10
Library	58	3	2
Publications	2,083	1	8
Postage, Stationery, Telephones, etc.	315	4	8
Rent, Rates, Insurance	149	0	5
Light, Heat, Water, Cleaning	366	3	0
Laboratory apparatus	275	7	5
Contingencies		16	0
Audit and contribution towards Headquarters	335	0	0
Furniture and equipment	196	16	3
Visits overseas	100	1	8
	14,456	7	10

Balance on 31st March, 1948.	£	s.	d.	£	s.	d.
Joint Colonial Fund	7,000	0	0			
Crown Agents for the Colonies	400	2	9			
Bank	456	17	0			
Petty Cash	3	12	2			
Stamps	8	9	2			
F.S.S.U. Suspense Account	163	7	9			
	8,032	8	10			
Less: Income Tax Suspense		18	0			
				8,031	10	10
				£22,487	18	8

(Signed) E. J. ALLIES.
Accountant to Council.

(Signed) S. P. WILTSHIRE.
Director.

Investment at 31st March, 1948.
£2,077 15s. 4d. New Zealand 3½% 1960/64.

I have examined the above Account. I have obtained all the information and explanations that I have required, and I certify as the result of my audit, that in my opinion the above Account is correct.

(Signed) F. N. TRIBE.
Comptroller and Auditor General.

(Signed) S. HOWARD,
Secretary.

Executive Council, Commonwealth Agricultural Bureaux.
31st August, 1948.

COMMONWEALTH BUREAU OF BIOLOGICAL CONTROL

ACCOUNT OF RECEIPTS AND PAYMENTS FOR THE YEAR ENDED 31ST MARCH, 1947

RECEIPTS

	Canada		United Kingdom	Total
	$ c	£ s. d.	£ s. d.	£ s. d.
Balance on 1st April, 1946	14,442·54	3,245 10 3	1,019 16 11	4,265 7 2
Contributions from Commonwealth Governments	5,050·00	1,250 0 0	3,557 4 9	4,807 4 9
Contributions for Special Projects	40,431·65	9,885 2 10	899 16 9	10,784 19 7
Rent of Farnham House			450 0 0	450 0 0
Fee for storage space at Farnham House ...			10 0 0	10 0 0
Sale of Equipment and Furniture			417 0 0	417 0 0
Sales of Publications ...	214·45	51 1 10	164 11 8	215 13 6
Interest:—				
General Account ...			10 10 1	10 10 1
Capital Account ...			2 16 3	2 16 3
Remittances from the United Kingdom ...	16,490·00	4,000 0 0		4,000 0 0
Gain by Exchange on Sterling value of Dollar balances		361 2 11		361 2 11
	$76,628·64	18,792 17 10	6,531 16 5	25,324 14 3

PAYMENTS

	Canada		United Kingdom	Total
	$ c	£ s. d.	£ s. d.	£ s. d.
Director's salary	5,793·00	1,400 17 7	60 0 0	1,460 17 7
Superannuation ...	231·25	57 4 9	69 18 5	127 3 2
Scientific and Technical Assistant Entomologists	11,191·00	2,710 5 10	142 17 10	2,853 3 8
Superannuation ...			194 0 0	194 0 0
Clerical Staff	3,510·19	849 6 8	40 1 11	889 8 7
Laboratory Stewards	4,640·56	1,132 6 4		1,132 6 4
Superannuation			93 3 3	93 3 3
Laboratory Maintenance	3,889·15	952 5 10	19 10 2	971 16 0
Rates			11 12 10	11 12 10
Fire and other Insurances			18 13 3	18 13 3
Travelling expenses ...	8,572·18	2,102 0 9		2,102 0 9
Freight and Postages ...	1,476·70	361 10 2		361 10 2
House Maintenance ...			395 5 0	395 5 0
Publications	390·15	96 7 3		96 7 3
Audit Fee			10 0 0	10 0 0
Contribution to Headquarters			50 0 0	50 0 0
I.A.B. Conference 1946	1,041·56	246 5 1		246 5 1
	40,735·74	9,908 10 3	1,105 2 8	11,013 12 11
Remittances to Canada ...			4,000 0 0	4,000 0 0
Balances on 31st March, 1947.				
United Kingdom:—				
Joint Colonial Fund ...			1,000 0 0	
Crown Agents for the Colonies:—				
Capital Account ...			189 6 6	
General Account ...			157 3 7	
F.S.S.U. Suspense ...			80 3 8	
				1,426 13 9
Canada:—				
Sundry imprests ...	5,070·32			
Treasury	30,472·58			
	35,542·90			
Suspense	350·00			
	35,892·90	8,884 7 7		8,884 7 7
	$76,628·64	18,792 17 10	6,531 16 5	25,324 14 3

The Auditor's certificate is not appended, but it is expected in the near future.

(Signed) E. J. ALLIES,
Accountant to Council.

(Signed) S. HOWARD,
Secretary.

Executive Council,
Commonwealth Agricultural Bureaux.
26th August, 1948.

APPENDIX I

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS

Report of Informal Discussions on F.A.O. Proposals for a World Catalogue of Genetic Stocks of Value to Plant Breeders

Washington, D.C., U.S.A.

April 19—23, 1948

Following a recommendation of the Quebec Conference (1945) a meeting of experts was called at Washington in May, 1947, to advise F.A.O. on the desirability and feasibility of a world catalogue of genetic stocks. The broad outlines of the project were developed at that time and since then its feasibility has been further explored in much greater detail. The meeting herein reported made a critical review of plans thus far developed by F.A.O. and approved all essential features of the scheme.

Presenting its recommendations the meeting of experts (May, 1947) urged that before the project received final approval, F.A.O. should arrange for discussions between representatives of the British Commonwealth Agricultural Bureaux and United States Department of Agriculture (U.S.D.A.) plant scientists. These two organisations have been concerned for many years with the conservation of genetic stocks and with the exchange of seed between plant breeders in many countries throughout the world. It was thought that consultations between F.A.O. and these organisations might result in a co-ordinated plan in which F.A.O. could perform a useful function and in which all countries could participate to their mutual advantage.

This report summarises the results of informal discussions at F.A.O. headquarters during the week of 19th April, 1948. Those present at the meeting are listed in an appendix to this report. In addition to representatives from the U.S.D.A. Bureau of Plant Industry (Divisions of Cereal Crops, Forage Crops, and Plant Exploration), and from the Commonwealth Agricultural Bureaux, there were represented also the North Central States Association of Experiment Stations, the U.S. National Research Council, and the Canadian Department of Agriculture. One of the representatives from Canada was Dr. C. H. Goulden who had been engaged with F.A.O. for several months in developing the mechanics of the plan outlined below.

Agenda of the Meeting

The discussions centred around a few main considerations as follows:

(1) Review of the present status of work with genetic stocks of value to plant breeders and the methods employed, having special reference to the perpetuation of such stocks, the recording and describing of varieties, and the existing facilities for supplying seed or vegetative stocks to plant breeders.

(2) Reconsideration of the F.A.O. proposal for a world catalogue of genetic stocks with respect to desirability and feasibility.

(3) Critical examination of the exploratory work on this subject done by F.A.O.

(4) Means whereby perpetuation of the stocks could best be insured.

(5) Means whereby information from the catalogue can best be made available to plant breeders and exchange of seed facilitated.

(6) Measures to promote the direct exchange of information between plant breeders throughout the world who are engaged in similar research projects.

Consensus of the Meeting

It was unanimously agreed that it is desirable that F.A.O. undertake the cataloguing of genetic stocks of value in plant breeding. Complete agreement was reached also on plans for carrying out the project. It was recommended that governments be invited to approve the scheme and co-operate with F.A.O. in its operation.

Owing to the magnitude of the task and the limited facilities available it was considered desirable that F.A.O. should restrict the scope of its work in the first instance to wheat. As soon as possible it should be extended to rice, thus embracing the two greatest food crops of the world. Then as opportunity and facilities permit the catalogue should be enlarged to include other self-fertilised crops, especially the other cereals and crops of special importance to certain areas such as soybeans. The cross-pollenated crops present special problems, but eventually these also should be included, especially grasses and legumes.

The scheme which seemed most practicable for wheat (and other self-fertilised crops) is as follows:

The catalogue of genetic stocks of wheat should include only such stocks as are being perpetuated. Plant breeding material of the following categories in particular should be considered for inclusion:

(*a*) commercial varieties and races,

(*b*) other varieties of demonstrated value for use as parents,

(*c*) other material having genes or special characteristics thought to be of value to plant breeders,

(*d*) related species and genera, and indigenous wheats that may have been collected in the wild.

In order to insure that viable seed is maintained of all wheats reported in the catalogue, each F.A.O. member country should be invited to co-operate by assuming responsibility for perpetuating the wheats of its own area. Plant breeders do maintain viable seed of the stocks in which they are personally interested and these in the aggregate may represent quite a comprehensive collection. A central nursery or nurseries in each country containing all the wheats of significant value in plant improvement would systematise the work and thereby ensure continuity. It would also greatly facilitate the cataloguing of the material of each country by making it unnecessary for F.A.O. to contact plant breeders individually.

While from the standpoint of F.A.O. and for the reasons suggested, the Committee considered a central nursery highly desirable, some countries may prefer to organise the work of perpetuating the plant breeding material in such a way as to distribute the task between two or more existing institutions. Or it may be found desirable in certain cases to delegate the responsibility to their states, provinces, or geographical regions. The task of F.A.O., however, will be made easier if the necessary data can be secured in each country from as few nursery centres as possible.

If the proposal outlined above for perpetuating genetic stocks meets with general approval, the wheats of the entire world would ultimately be at the disposal of the plant breeders of every country; yet each country would have to make provision only for maintaining those of its own area. Co-operation would lead to an increase in efficiency and a reduction in expenditure.

In order that F.A.O. may be furnished with the necessary data for the world wheat catalogue each country which decides to participate should undertake to supply F.A.O. with particulars of every wheat stock in the central nursery deemed by plant breeders or other competent authority in the country to possess one or more characteristics which make it of interest or possible value for plant breeding anywhere in the world. Special forms (Appendix, Form 1) are to be supplied by F.A.O. so that descriptions of the varieties and genetic stocks may be filled in with a minimum of effort. These forms would then be assigned a catalogue number. With respect to each entry submitted for inclusion in the catalogue, there should be a general understanding that viable material of all wheats so included will be maintained in sufficient quantity to meet at once or in the near future, all reasonable requests for seed samples of the variety in question. As will be seen below, for wheat this involves only a relatively small amount of space and labour.

In addition to those wheats which appear to have value at the present time and are therefore included in the world catalogue, there will be many others that possess unknown valuable characteristics. For this reason they should be preserved if at all possible. If at a later stage any of them prove to have value for wheat improvement, they should be multiplied to provide a small reserve of seed. Description forms might then be completed and sent to F.A.O. for inclusion in the catalogue.

Any breeder or institution possessing a world collection of wheat, or a large collection from other than his own area, should be encouraged to maintain it. He might state at the same time whether he would be prepared to maintain stocks of any of them at a later stage if called upon to do so. In this way it would sometimes be possible to insure the perpetuation of certain stocks that have not been provided for elsewhere.

It frequently happens that valuable collections of plant breeding material in the hands of individual plant breeders are lost through illness or retirement of the owner, or because they can no longer be maintained with the funds available. This situation sometimes occurs also with plant breeding departments and with institutions. Since the Agriculture Division of F.A.O., which operates the world catalogue, would normally be aware of circumstances of this kind, it should be regarded as an important function of that Division to see that such collections are preserved by arranging to have them transferred to another perpetuating centre.

Having received the required information from each country, F.A.O. would proceed to set up the world catalogue and make the information available to plant breeders in the following manner.

Information on each of the description forms would be transferred to punched cards. The great advantage of the punched card system is that the work of sorting the records for any stock or groups of stocks, and of recording complete information on each stock, can be fully mechanised. The saving in clerical staff thus effected makes it possible to process large numbers of records at relatively small cost. These cards will constitute the World Catalogue.

On the basis of these records a list of the catalogued stocks, classified according to their important characteristics (Appendix, Table 1), would be compiled and circulated to all contributing breeders and, upon request, to others. From examination of these lists, a plant breeder could see whether any of the stocks in the catalogue possess properties of special interest, and if so, complete available information regarding such stocks would be supplied to him by F.A.O. on application. If the breeder desires to secure seed he should write direct to the station holding the stock. Quarantine regulations of the countries involved will often suggest the best procedure in the exchange of seed, but F.A.O. would give all possible assistance in case of difficulty.

Cost to Governments of maintaining Wheat Stocks in Central Nursery

It was emphasised that, for a crop such as wheat, a central nursery can be maintained at small expense. About a pint (or ½ litre) of seed from each stock would usually be sufficient to provide a small package for each plant breeder who might request it and the seed, if properly stored, will remain viable for at least five years. Seed supplies could be maintained, therefore, by growing one-fifth of the stocks each year, or 200 short rows per year if the total number of stocks were 1,000. This would be a very small undertaking if the task were assigned to the staff of an institution engaged in plant breeding.

Cross-fertilising Crops

Although this report is largely confined to the self-fertilising crops, it is recognised that similar treatment should be given to the cross-fertilising species, particularly among the herbage and forage grasses and legumes, and the brassicas. Although these types present a number of difficult problems as far as the securing of uncontaminated seed stocks from living collections is concerned, it is felt that these difficulties are not by any means insurmountable and that it is desirable that the question of the cataloguing and maintenance of genetic stocks of these crops should also receive consideration by F.A.O. in due course. The key to the successful operation of such a scheme would probably be a system of decentralised growing-on nurseries since spatial isolation is essential.

Listing of Institutions and Research Workers engaged in Plant Breeding, by Location and Fields of Specialisation

At the present time there is available in some member countries a list of research workers in the field of agriculture. These lists do not usually classify research workers by fields of specialisation or indicate the relative amount of emphasis being given to the various plant breeding problems on which research is being conducted. Throughout the world, however, there is a general lack of such up-to-date lists giving locations of institutes and their technical staffs engaged in plant breeding.

If this information were available, plant breeders insist that it would be extraordinarily useful. Since the world catalogue is necessarily restricted at first to one or two crops, this listing of stations and plant breeders will provide an alternative means by which plant breeding stocks may become more generally distributed and used. In the United States, for example, much of the

rapid progress in corn improvement has been attributed to the exchange of materials among breeders. Within the confines of a small geographical area, such exchanges of materials are easily facilitated because each institution has information on the scope of work under way, the climatic factors, and, equally important, the workers engaged in research in the same crops, at all nearby institutions. Similar illustrations with other crops in other countries could well be cited. The significance to plant improvement of exchange of materials and information on a world wide basis is readily apparent.

Discussion of this subject led to the conclusion that F.A.O. could perform a very useful service by preparing and making available, a world list of plant breeders, giving their official address and the particular research problems on which they are working. It was generally agreed that three types of information were necessary to obtain the maximum benefit from such an undertaking:

(1) A list of the research institutions and plant breeders working on each of the crops. Since one of the major objectives of this programme is to facilitate exchanges of material between breeders it becomes important for breeders of all crops to know the names of individuals to whom such requests could be made.

(2) A list of crop plants on which improvement work is currently in progress. This listing of crops should indicate the relative intensity of work and should include the major objectives of the breeding programmes. From such information, interested breeders would be in better position to know if materials might be available and the possible usefulness in their own breeding programme.

(3) Climatological data, elevation, soil type and other factors at each institution, which would be of benefit as a guide in evaluating crop adaptation of their materials when grown in other localities.

It was suggested that with respect to item (3), information could readily be obtained from institutions through the heads of departments engaged in plant breeding, but it was agreed that a questionnaire, regardless of how well devised it might be, would be a poor substitute for the comments of an experienced observer. Climatological data, for example, may fail to disclose the peculiarities of rainfall distributed throughout the growing season or the vagaries of temperature changes. Without disparaging the value of limited data based on formal statistics, it was stressed that much more useful information could be obtained by personal discussions with plant breeders through the Regional Offices of F.A.O.

APPENDIX II

COMMONWEALTH INSTITUTE OF ENTOMOLOGY

DIRECTOR'S REPORT FOR 1947-48

The steady progress in all directions of the past few years has been maintained. The number of insect specimens sent in for identification was considerably lower than for the previous year but the number of determinations sent out showed an increase of 16 per cent. The high demand for the publications continued and sales reached a new record figure with an increase of 16 per cent. over the corresponding figure for the previous year. In view of the very considerable increase in the costs of printing it was found necessary to raise the subscription rates for the 1948 volumes of our journals which had remained stationary for 13 years; the rate for the Review of Applied Entomology Series A was increased from 30s. to 40s., of Series B from 15s. to 20s. and of the Bulletin of Entomological Research from 30s. to 40s. Despite this advance in prices all the indications are that no falling off in the number of subscribers will result.

The demands on the general information service have been heavy both from Government Departments at home and overseas. Commercial firms and private individuals have also made use of our services.

The accommodation problem referred to in the last annual report remains unsolved but every effort is being made to secure a satisfactory solution.

Staff

Mr. D. J. Atkinson, O.B.E. (formerly Chief Conservator of Forests, Burma) and Mr. G. J. Kerrich (formerly Assistant Keeper in Entomology in the Manchester Museum) were appointed to vacancies on the staff in Grade A and Grade B respectively during the year.

Identification of Insects

During the year under review the number of specimens received amounted to 41,536, as compared with 64,144 in the previous year. These insects were sent in by 160 (142) different correspondents, who were geographically distributed as follows:—Africa 55 (54), America 17 (18), Asia 19 (15), Oceania 14 (12), Europe 55 (43), all the numbers in brackets being those for the previous year.

The lists of identifications sent out totalled 318 (300), comprising 7,217 (6,254) names. The actual numbers of identifications sent to the various Dominions, Colonies, and other territories are as follows:—

AFRICA:				
Union of South Africa	537	(502)		
Southern Rhodesia	152	(133)		
Sudan	523	(341)		
Gold Coast	378	(93)		
Kenya	966	(1262)		
Nigeria	87	(129)		
Nyasaland	33	(13)		
Sierra Leone	32	(93)		
Tanganyika Territory	70	(58)		
Uganda	168	(347)		
Other Territories	1635	(876)		
			4,581	(3,847)
AMERICA:				
Canada	—	(—)		
West Indies	82	(148)		
Other Territories	231	(253)		
			313	(401)
ASIA:				
India and Burma	82	(479)		
Ceylon	—	(—)		
Cyprus	6	(—)		
Malaya	332	(—)		
Palestine	196	(486)		
Other Territories	458	(60)		
			1,074	(1,025)
OCEANIA:				
Australia and New Guinea	756	(318)		
New Zealand	46	(15)		
Fiji Islands	8	(188)		
Solomon Islands	13	(85)		
Other Islands	32	(22)		
			855	(628)
EUROPE:				
United Kingdom	329	(218)		
Other Countries	65	(135)		
			394	(353)

In addition to the named specimens which are returned to the senders 18,722 (17,325) insects have been handed over to the British Museum, of which 147 (56) were types of species new to science, and among the remainder 395 (437) named species not previously represented in the National Collection. A number of specimens were also presented to the London School of Hygiene and Tropical Medicine, the Massachusetts State College, and Dr. Ewen Cameron.

During the year 15 papers (422 pages) on insect taxonomy have been published by 5 members of the staff.

Publications

Difficulties experienced in the printing trade were again responsible for the delay in appearance of some of the parts of our journals but on the whole the delays were rather less than in the previous year.

Subscriptions and sales continued to rise sharply. Subscriptions increased by some 17½ per cent. and total sales of back numbers were well maintained.

Total net cash receipts for all journals during the financial year 1947-48 amounted to £5,884 3s. 11d. against £5,068 10s. 9d. for 1946-47, thus exceeding the previous year's record by £815 13s. 2d.

"Review of Applied Entomology"

The 35th (1947) volumes of the two series of the "Review of Applied Entomology" comprised 633 pages (exclusive of indices) as against 598 (1946) and 1,355 abstracts and titles against 1,287 (1946).

Subscriptions to Series "A" increased from 837 (1946) to 860 (1947) and for Series "B" from 696 (1946) to 739 (1947).

Sales of back numbers amounted to £869 0s. 6d. against £882 4s. 4d. (1946).

Total cash receipts for the Review during the Calendar year 1947 amounted to £3,225 8s. 5d. against £2,781 13s. 4d. for 1946.

"Bulletin of Entomological Research"

The 38th volume (1947) of this Journal contained 622 pages against 632 in the previous volume. It comprised 43 papers, and was illustrated by numerous text figures and eleven plates.

The number of subscribers rose from 520 (1946) to 572 (1947).

Sales of back numbers amounted to £595 0s. 9d. against £705 14s. 0d. in 1946.

Total cash receipts for the calendar year 1947 amounted to £1,674 6s. 5d. against £1,711 8s. 2d. for 1946.

"Zoological Record, part Insecta" Vol. 83 (1946)

The hopes that a change of printer would result in speeding up the appearance of this publication were unfortunately not fulfilled. Owing to the very great difficulty experienced by the new printers in obtaining the required accents the work was held up and did not appear during the financial year under review. Vol. 83 appeared in September, 1948. Orders for 35 copies had been entered up to 31st December, 1947 but the bulk of the sales will appear in the 1948 accounts.

The steady demand for back volumes was maintained, sales amounting to £270 14s. 5d. against £295 15s. 7d. in 1946.

The net profit to the Institute for the calendar year 1947 amounted to £148 15s. 11d. as against £171 9s. 9d. for 1946.

The future sales will be slightly affected due to the fact that several of the earlier volumes are now sold out.

The annual contribution of £100 was received from the Zoological Society of London towards the cost of preparation.

Other Publications

Sales of "A Review of the Literature on Soil Insecticides" by Dr. H. G. Gough, published by the Institute in November, 1945, totalled 158 copies during 1947. Forty-six copies of "Locusts and Grasshoppers," 10 copies of "The Biological Control of an Insect in Fiji" and 8 copies of "The Coconut Moth in Fiji" were also sold during 1947.

The net cash received for these and other miscellaneous publications amounted to £136 11s. 0d. as compared with £229 2s. 2d. in the previous year.

Library

Accessions during the year numbered 350 (297) bound volumes and 1,227 (933) pamphlets, making a total of 11,829 volumes and 33,633 pamphlets. Current exchanges were maintained and new ones made and some sets of German and Far Eastern publications made up. Parts of 547 (503) serial publications were received, the countries of origin being as follows:

BRITISH EMPIRE:		
United Kingdom	49	(49)
Overseas	123	(120)
FOREIGN:		
Europe	151	(126)
Africa	16	(19)
Asia and Polynesia	15	(7)
United States and Territories ...	140	(123)
Central and South America ...	53	(59)

The author catalogue now comprises some 140,700 cards and is up-to-date for monographs and separates, and the sheaf catalogue of serial and official publications (some 4,200 slips) is also up-to-date. The latter has often proved very useful in answering bibliographical enquiries. The entomological contents of 116 volumes were catalogued during the year, arrears amount to 3,291 volumes. Outside loans, which included one to the U.S.A. and one to Baghdad, numbered 1,095 (1,267), government departments, scientific institutions, commercial firms and students being among the borrowers. Staff and visitors made daily use of the library and numerous inquiries on varied subjects were answered.

A good deal of the librarian's time was spent in helping to prepare the "List of Serial Publications examined for the Review of Applied Entomology" and, when time permitted, further work was done on revising the library's holdings for the new edition of the "World List of Scientific Periodicals." Questionnaires on various bibliographical and organisational matters were received from the Library Association, U.N.E.S.C.O., A.S.L.I.B., the Science Museum Library and other bodies and these were duly completed. The library joined the Science Library Supplementary Lending Scheme in June, 1947, and sends in monthly lists of books received.

During the course of years a considerable amount of duplicate and unwanted material had accumulated and this was sorted and lists were prepared and sent out to various organisations. As a result, donations were made to the British Museum (Natural History), London School of Hygiene and Tropical Medicine, Islington Public Libraries and two Italian libraries (through U.N.E.S.C.O.). This was supplementary to the usual practice of the library in sending periodical collections of unwanted material to interested libraries, those of the Commonwealth Agricultural Bureaux being given preference.

Special thanks are due to the donors of various publications which were lacking in the library, among whom the following may be mentioned: Professor Dr. E. Strand, Riga; Dr. Wilbur G. Downs, Rockefeller Foundation, Mexico; Army Medical Library, Washington; School of Agriculture, Cambridge and the Deutsches Entomologisches Institut, Vollrathsruhe.

APPENDIX III

COMMONWEALTH MYCOLOGICAL INSTITUTE

ANNUAL REPORT FOR 1947-48

The year has been characterised by a gradual increase in activity in all branches of the work of the Institute. Incoming literature was much greater and a noticeable increase in enquiries and correspondence was recorded. Lack of accommodation and the consequent limitation of staff are now definitely impeding the work of the Institute. An important development during the year was the starting of a culture collection, details of which are given below.

Investigational Work

Dr. Wiltshire completed a study of the species of Alternaria on brassicae and the results were published in Mycological Paper No. 20.

Major Dade after a prolonged attempt to find a rapid and permanent method of sealing fluid microscopical counts, so important for our recording system and herbarium collection, was finally successful. A suitable cement has been compounded with the assistance of Mr. S. Waller, a member of the Quekett Club, and an appropriate sealing tool has been devised.

Mr. Mason has continued his studies on the Hyphomycetes in conjunction with Mr. Hughes and Mr. Ellis. He contributed a joint note with Mr. Hughes on a new species of *Helminthosporium* from the soil which is being published in the Transactions of the British Mycological Society. He also delivered the chairman's address to the mycological section of the Yorkshire Naturalists Union on "some common moulds" and this has been published in the Naturalist for 1948. His studies on *Torula* and allied genera have progressed to the stage when the data can be prepared for publication.

Dr. Bisby had considerable correspondence on nomenclature and taxonomy arising out of the "Dictionary of the Fungi" and the "Introduction to Taxonomy and Nomenclature of Fungi." Among his correspondents were Drs. Nannfeldt, Boedijn, Donk, Kanouse, A. H. Smith, D. P. Rodgers, and K. F. Baker, a testimony to the interest that has been aroused by these works.

Dr. Bisby prepared for press the MS. of the late Professor R. H. Buller's Vol. vii of "Researches on Fungi" and arrangements have been made for its publication in Canada.

The typescript amounting to over 100 pages of "The fungi of Ceylon" by Mr. Petch and Dr. Bisby was sent to Ceylon for publication.

Dr. Bisby was responsible for the compilation of a "List of common tropical plant diseases" which was issued as a Mimeographed Publication No. 4 by the Institute. He also assisted in the preparation of "Emendations to the List of common British plant diseases" which is expected to appear in the *Trans. Brit. Mycol. Soc.*

Miss Waterhouse in addition to her work as subeditor continued her studies on the genus *Phytophthora* and other Phycomycetes. She isolated species of *Pythium* from beet seedlings from Eire and tomato seedlings from Scotland and the isolates have been returned there for inoculation experiments. A species of *Saprolegnia*, probably *S. parasitica*, was isolated from a gold fish by a local aquarium. She has also assisted in the preparation of a paper by Miss Blackwell, of the Royal Holloway College on "Terminology in Phytophthora" which it is hoped to publish in mycological papers.

Mr. Hughes made further progress in his studies on the Hyphomycetes and prepared a number of papers dealing with fifteen genera for the press. It is hoped to publish these in the near future as a series in mycological papers.

Mr. Ellis in his work on the Hyphomycetes completed his work on the genus *Tetraploa* and his paper has been accepted by the *Trans. Brit. Mycol. Soc.* A paper by Mr. Ellis in collaboration with Dr. Bisby on *Stachybotrys dichloa* and a species of *Stachybotrys* has also been accepted for publication in the *Trans. Brit. Mycol. Soc.* Studies were also made on the genus *Arthrinium*. The three British species of this genus were grown in culture using the new technique of disinfecting with propylene oxide, two of the species being grown in culture apparently for the first time. Further work has also been done on *Clasterosporium caricinum* including some interesting cultural experiments.

Identification Work

Specimens and culture have been received from Anglo-Egyptian Sudan, Canada, Eire, Gold Coast, Great Britain, India, Jamaica, Malaya, Malta, Mauritius, New South Wales, New Zealand, Northern Ireland, Seychelles, Sierra Leone, South Africa, Southern Rhodesia, Tanganyika Territory, Tasmania, Trinidad, and Uganda, as well as from Argentine, Belgian Congo, Denmark, Egypt, French Equatorial Africa, Holland, Spanish Guinea, Sweden, the United States, and Venezuela. Among the more interesting specimens received the following may be mentioned. *Corcospora oryzae* was received on rice from the Sudan, a new record for that country and the first time the fungus has been received at the Institute. An isolate of *Trichoconis padwickii* from rice was received from Malaya; this species was described from India. *Ceratostomella adiposa* was received isolated from a book back in England. This species was originally described as a parasite of sugar-cane in India. *Phoma eupyrena*, associated with lettuce in England, is being studied elsewhere for its antibiotic properties. An isolate of *P. gloomerata* was received from dosooti originating from Cawnpore, India. *Metarrhizium brunneum* Petch was determined as the fungus attacking wireworm from the United States. *Septonema agaves* J. A. Stevenson on *Agave* from Jamaica was first recorded from Jamaica in 1921 as *Heterosporium* sp.

The cataloguing and reorganising of the herbarium has proceeded rapidly during the year. Approximately 13,000 specimens were numbered and entered in the accessions book during the year making a total of approximately 24,000 entries. Many of the specimens accumulated in former years have now been placed in the herbarium. Cross entries in the host and fungus indexes have been made as far as the work allowed

but much remains to be done. As the work proceeds improvements in technique are constantly being made and there is no doubt that the energy and zeal of the herbarium staff in this work is producing most valuable results to the Institute.

Preparation of specimens for exchange

Further additions to the specimens available for exchange have been made and the total number now amounts to about 300. A list of the specimens is in preparation.

Culture Collection

At the beginning of the period under review the formation of a culture collection at the Institute was begun. An important feature of the Institute's collection of cultures is that it is essentially an extension of the herbarium. The cultures are being given Herb. I.M.I. accession numbers and are being backed as far as possible with herbarium specimens from which the isolations were made. It was intended that we should build up our collection very gradually but subsequently the decision of the Lister Institute to discontinue the maintenance and distribution of fungus cultures necessitated our taking over the National Collection of Type Cultures without delay. At first the Institute only undertook to care for those of phytopathogenic interest but the Specialist Conference on Culture Collections of Micro-Organisms held in London in August, 1947, recommended (par. 14 (*b*) of the Report of the Conference, H.M.S.O.) that "in the United Kingdom . . . the Imperial Mycological Institute should be responsible for cultures of fungi other than medical fungi and yeasts" though it was understood that the timber-rotting fungi should still be maintained at the Forest Products Research Laboratory, Princes Risborough. It was emphasised that this heavy additional work could not be carried out without provision being made for staff and apparatus. Before incorporation of the National Type Culture Collection into the Institute collection every culture is being examined and checked and this work has necessarily been limited by the lack of staff. Major Dade has devoted almost all of his time to the work and with the help of a junior laboratory assistant has carried on under great difficulties. A refrigerator was only acquired in January, 1948, and the delay in delivery not only occasioned difficulties of storage space but resulted in a severe mite infestation which greatly hindered the work. In addition to the Lister fungi many isolations have been taken over from the herbarium and several obtained from outside sources. At the end of the year there were 450 isolations in maintenance and about 500 cultures from the Lister in cold storage.

Distribution of cultures began in June, 1947, and by the end of the financial year the Institute had supplied 203 cultures for payment, the total receipt being £59 17s. Of these 94 went to industrial firms, 73 to colleges and schools, and 26 to the Ministry of Supply and other Service departments. In addition about 50 cultures were supplied free of charge to Ministry of Agriculture workers, to our own herbarium, and as exchanges to collaborating mycologists.

Visit of Dr. Bisby to Malta

During February, 1948, Dr. Bisby visited Malta in connection with the preparation of a list of Malta fungi. He has examined numerous specimens from the Department of Agriculture, Malta, and made valuable contacts.

The Institute has again been favoured with valuable assistance of the following authorities in the indentification of species in various groups: Dr. W. L. Gordon of Canada, Mr. T. Petch of King's Lynn, Miss Wakefield and Dr. Dennis of the Royal Botanic Gardens, Kew, Dr. Cummins of Purdue University, United States, and Mr. G. Smith of the London School of Hygiene and Tropical Medicine.

Information Service

The total receipts from all publications amounted to £3,030 3s. 6d. compared with £2,802 last year.

Review of Applied Mycology

Vol. xxvi of the Review contained 576 pages and 1,424 abstracts as against 592 and 1,459 abstracts for the preceding year. The Index for Vol. xxv contained 78 pages.

The distribution of the Review at the end of the year was as follows:—

	Free	Exchange	Subs.	Total
British Commonwealth & Anglo-Egyptian Sudan	78	40	360	478
Foreign Countries	—	95	507	602
Total ...	78	135	867	1,080

Receipts from sales of the Review amounted to £2,363 14s. 4d. compared with £2,553 3s. 11d. for the previous year, showing a decrease of nearly £200, due to a falling off in requests for back numbers. The price of the Review was raised from 30s. to 40s. from the beginning of 1948.

The volumes of the *Review* out of print (1-viii and xii) were microfilmed and a small number of microfilm copies supplied.

Supplements to the Review

Supplements 15 and 16 listing new species of fungi were compiled and issued during the year.

The number of subscribers to the *Supplements* amounted to 154 by the end of the year, an increase of 8. Receipts from sales totalled £33 14s. 10d.

Mycological Papers

Five papers were issued during the year: No. 19 by Dr. Boughey on "The effect of rainfall on plant diseases distribution in the Anglo-Egyptian Sudan"; No. 20 by Dr. Wiltshire on "Species of Alternaria on Brassicae"; No. 21 by Dr. Boughey on "The cause of variations in the incidence of blackarm disease of cotton in the Sudan Gezira"; No. 22 by Dr. Boughey on "The causes of variation in the incidence of Cotton leaf curl in the Sudan Gezira"; and No. 23 by Mr. C. G. Hansford and Mr. Deighton on "West African Meliolineae." Receipts from sales were £132 5s. 0d. against £142 4s. 2d. but there was a slight increase in the number of subscribers (77 as against 74).

The Annotated Bibliography of Medical Mycology

The bibliography for 1946 was published during the year. It comprised 51 pages containing annotations of 198 papers. A grant of £15 was again received from the Honorary Committee of Management of the Bureau of Hygiene and Tropical Diseases and £43 5s. 6d. from sales compared with £32 5s. 10d. in the previous year.

Mimeographed Publications

Three Mimeographed Publications were issued during the year, No. 3, Bibliography of systematic mycology 1943-1946; No. 4, A list of common tropical plant diseases; and No. 5, Bibliography of Systematic Mycology 1947. It is hoped to continue this bibliography each year. The list of common tropical plant diseases has been circulated to plant pathologists overseas and a number of valuable comments received. In due course it is hoped to expand the list and issue it in printed form.

The bibliography of antibiotics distributed to a very few clients interested in the subject was discontinued after an experimental period of 18 months, after valuable experience in surveying the field covered has been gained.

Library

A mimeographed list of 149 translations filed in the Library was issued to plant pathologists throughout the Commonwealth and a considerable number of requests have been received for the loan of translations.

A considerable number of books and reprints were lent during the year.

Staff

Mrs. Rosenfeld joined the Staff as Slavonic Abstractor on 1st July, 1947. Mr. P. D. Hewitt, temporary herbarium assistant left on 20th September to enter on his studies at the Imperial College of Science. Mr. Harper and Mr. Madelin, joined the staff as temporary herbarium assistants.

S. P. WILTSHIRE.

4th October, 1948.

APPENDIX IV

COMMONWEALTH BUREAU OF BIOLOGICAL CONTROL

DIRECTOR'S REPORT FOR 1947-48

The projects assigned to the Bureau of Biological Control by Empire States and other countries during the financial year 1947-48 were as follows:—

Canada:
South American Grasshoppers.
Juniper Scales.
Spruce Budworm.
Potato Tuber Moth.

Australia:
Potato Tuber Moth.
Californian Red Scale.
Wheat Stem Weevil.

New Zealand:
Grass Grubs.
White Grubs.

South Africa:
Karroo Caterpillar.
Prickly Pear.

Barbados:
Coconut Scale.

Bermuda:
Bermuda Cedar Insects.
Citrus Aphid.

Grenada:
Diamond Back Moth.

Mauritius:
Black Sage.
Sugar Cane Moth Borer.

Antigua:
Sugar Cane Moth Borer.

Palestine:
Red Scale.

Italy:
San Jose Scale.

Two hundred and fifty-two consignments of beneficial insects comprising a total of 179,985 specimens were sent by the Bureau of Biological Control to Empire States and other countries shown in the following table.

Country	*Shipments*	*Specimens*
Canada	7	4,385
Australia	31	9,620
South Africa	27	44,824
Antigua	5	730
Barbados	9	3,330
Bermuda	131	106,884
Mauritius	37	7,472
Palestine	4	1,740
Italy	1	1,000
	252	179,985

Work in Europe was opened up. Extensive investigations were made on behalf of Canada and shipments also made to Bermuda, although the unsettled conditions hampered work very considerably.

The funds received from Empire Governments for special projects during the financial year totalled $40,408.93 (£10,102) which excluded a sum of $9,109.51 (£2,277) unpaid at 1st April, 1948. Canada provided $7,000.00 (£1,750), Australia $2,141.54 (£535), South Africa $8,635.55 (£2,159), New Zealand $134.67 (£34), Colonial Office $278.43 (£70), Mauritius—Cordia $1,600.00 (£400), Mauritius—Diatraea $933.89 (£233), Bermuda $19,599.86 (£4,900) and Palestine $84.99 (£21).

The Bermuda amount is $14,599.86 (£3,650) transferred from Bermuda 26th June, 1947, plus $5,000.00 (£1,250) received in February, 1948.

The unpaid amounts at 1st April, 1948, were Australia $1,056.99 (£264), Barbados $251.43 (£63), South Africa $2,094.32 (£524), New Zealand $308.00 (£77), Mauritius—Cordia $4,824.33 (£1,206), Mauritius—Diatraea $483.72 (£121) and Colonial Office $90.72 (£23). The item of $90.72 (£23) for the Colonial Office was listed in the 1946-47 figures as outstanding; it comprises three cost accounts of 1945 (June $48.48 (£12), July $19.23 (£5), August $23.01 (£6) which have not been paid in to us.

In the 1946-47 report Mauritius is erroneously listed as having paid $8,047.35 (£2,012). This included £1,000 or at that time (June, 1946) (£1,108) $4,430.00 of basic funds plus £899 16s. 9d. or $3,617.35 received October, 1946 for special projects.

On the March, 1948, Central Account $1,600.00 (£400) was received from Mauritius.

The Mauritius unpaid balance as at 31st March, 1948, is figured as follows:

The amount received October, 1946 was	$3,617.35	£904
Cost Accounts May, 1946 and August to March, 1947	4,747.81	1,186
Overspent 31st March, 1947	$1,130.46	282½
Cost Accounts 1st April, 1947 to 31st March, 1948	5,293.87	1,323½
	$6,424.33	1,606
Cash received March, 1948	1,600.00	400
Unpaid balance 1st April, 1948	$4,824.33	£1,206

In addition to the above funds received for special projects, the following basic contributions were received from Commonwealth countries, the Colonies and the Anglo-Egyptian Sudan in the year, 1947-48:—

	£	s.	d.
United Kingdom	3,000	0	0
Canada	1,875	0	0
Australia	1,875	0	0
New Zealand	750	0	0
South Africa	937	10	0
Burma	60	0	0
Eire	375	0	0
Southern Rhodesia	150	0	0
Newfoundland	75	0	0
Anglo-Egyptian Sudan ...	150	0	0
The Colonies	2,455	13	8
	£11,703	3	8

In addition, £859 was received from India, and £2 1s. 7d. from British North Borneo for the year 1946-47, but the amounts were not cleared at the bank on the close of the year.

The headquarters of the Service in 1947-48 were maintained at Belleville, Ontario, Canada, in the Dominion Parasite Laboratory. Shortage of space will, however, make it necessary to move to larger quarters

and the possibility of finding accommodation in Ottawa is being investigated. The Californian substation was maintained in charge of Mr. W. F. Sellers, at the Citrus Experiment Station, Riverside, California, the South American station at Montevideo, Uruguay, in charge of Dr. D. C. Lloyd, the West Indian station in charge of Dr. F. J. Simmonds at the Imperial College of Tropical Agriculture. A temporary station was maintained in Bermuda from April to August, inclusive, in charge of the Director for the first half of this period, in charge of Dr. G. C. Ullyett during the second half.

Shortage of staff and the necessity of handling a variety of projects at widely separated points has obliged the Bureau staff to move over considerable areas during the financial year. From 1st April to 20th June, 1947, the Director was working in Bermuda, which he visited again, in company with Mr. A. B. Baird, from 10th to 20th December, 1947, and from 1st to 31st March, 1948. From 27th to 31st December, 1947, he was in Chicago attending the meetings of the American Association for the Advancement of Science. From 1st April until 1st August, 1947, Mr. W. F. Sellers was in Europe on the Canadian Budworm project. In August he went to Mexico City, to organise collections of the Cactus Weevil for South Africa. At the end of August, Dr. G. C. Ullyett and Dr. F. J. Simmonds came to Belleville from Bermuda and Trinidad and proceeded at once to Western Canada and the United States to make collections of Sugar Beet Webworm parasites for South Africa. Dr. Simmonds returned to Trinidad on 1st December, 1947. Dr. Ullyett remained at Belleville. Dr. D. C. Lloyd has worked over extensive areas in both Uruguay and Argentina. Dr. L. Mesnil and Dr. G. Bucher have travelled extensively through various parts of Central and Western Europe on the Budworm and Bermuda Scale projects.

The main projects undertaken by the Bureau of Biological Control during the financial year 1947-48, were as follows:—

Insects affecting Cereal and Forage Crops

Karroo Caterpillar (*Loxostege frustalis* Zell.)

Tests of parasites shipped from Canada to South Africa for the control of the Karroo Caterpillar having given favourable results, the South African authorities decided to make extensive liberations of several species and decided to finance the collection of very large quantities of parasite material. This is an unusually difficult project. The parasites required are obtained from the Sugar Beet Webworm (*Loxostege stricticalis*), which has to be collected in the Prairie Provinces. The infestations of the webworm, while often fairly heavy, are scattered and in regard to their exact location, unpredictable. Extensive scouting over very large areas is usually required to discover them. To obtain parasitised webworms it is necessary to collect cocoons from the soil which is a costly and laborious operation. Collections must be made late in the year and are liable to be interrupted or terminated by snowfalls.

For these reasons it was decided to assign two officers to the project. Dr. Ullyett and Dr. Simmonds were therefore recalled to Belleville early in September and proceeded almost immediately by car to Alberta, where approximately two million cocoons of the Sugar Beet Webworm were eventually collected. An additional search for infestations was then made in the Western United States but none was located.

Rearing and breeding work with the webworm material collected was continued during the winter by Dr. Ullyett after the return of Dr. Simmonds to Trinidad. After the close of the financial year, twenty-three shipments comprising 43,248 parasites belonging to four species were despatched to South Africa.

White Grubs (*Scarabaeidae*) and *Grass Grubs* (*Hepialidae*)

Owing to the dollar shortage, the New Zealand Government was unable to finance these investigations which were therefore discontinued.

Wheat-Stem Weevil (*Hyperodes griseus* Hast.)

Work on this project was renewed by Dr. Lloyd toward the end of September, 1947, when a programme for a parasite survey in the north-eastern section of the Argentine wheat belt was prepared. Some evidence had been collected in previous years to show that this section of the Pampa, which is usually characterised by a winter drought, carried the largest populations of the wheat-stem weevil.

On 30th September, Villa Maria, Cordoba Province, was visited and wheat crops were examined at Arroya Algodon, Sanabria and Ticino. The beetle was found to be common in some twenty stands examined. Samples of eggs and young larvae were easily collected.

From 5th to 9th October, wheat in the region of Alta Gracia was examined. This town lies on the extreme western edge of the wheat belt in a zone where the natural vegetation is shrub steppe and, in fact, ranching is of considerably more local importance. The little wheat present near Alta Gracia and Despenaderos was virtually free of weevil attack and no samples could be obtained. Further south on the road to Rio Tercero in the vicinity of Monte Roal, heavy attacks in wheat were again observed and samples taken.

From 20th to 26th October, wheat in the region of Rio Cuarto, a town situated in the marginal wheat zone about 200 Kms. south of Cordoba and 150 Kms. south-west of Villa Maria, was examined. At Gilda, San Ambrosio and Espinillo, wheat was much nearer maturity than in previous sampling stations, but the beetle attack was general on the edges of the wheat crops though these were not as heavily infested as in other sections. Barley, and rye, were also lightly attacked; but neither here nor elsewhere were infestations found in wild grasses.

In several of the foregoing regions, farmers use wheat as a forage crop and the resultant heavy tillering provided very favourable conditions for *Hyperodes*.

No parasites were found in any of the samples of eggs or larvae collected during the survey. Though the amount of material examined was small it was evident that parasites were nowhere common.

When this survey had been completed the work was discontinued, on instructions from New Zealand, owing to the dollar shortage.

The results of several years' work in Uruguay and Argentina, indicate that while the wheat-stem weevil is common and sometimes attacked by parasites, they are of little importance in their native home as controlling agents. Only actual introductions would show whether they would be useful in New Zealand.

Grasshoppers

The investigation and collection of grasshopper parasites in South America was continued by Dr. Lloyd on behalf of the Canadian Government.

Grasshopper parasite collections were continued in the foothill region of the southern Andes, Argentina, with the village of El Bolson as field headquarters. The survey was commenced on 31st December, 1947, and terminated on 16th April, 1948. The collections were made by casual workers employed on a monthly basis and by various families paid at the rate of two cents (Argentine) per grasshopper. In January and February excursions were made to the upper Chubat Valley and the Bariloche-Pilcaniyeu section of Rio Negro province. These points lie in the grass steppe country on the east of the Andes and the more important parts in which sampling might be feasible consist of grassy valley flats which also carry a high proportion of sedges. *Dichroplus vittiger* Blanch. is the typical grasshopper of these "mallines" but *D. arrogans* and *D. elongatus* also occur. However, no area was found where these were sufficiently abundant to justify sampling though local farmers in the Martin and Leleque sections maintained that five to ten years ago grasshoppers were a major pest in these flats. To compensate for the absence of sampling stations in the steppe section a station was selected at Los Repollos where the grass and shrub steppe begins to dominate.

From the nine sampling stations selected a total of 80,009 grasshoppers were collected from January to April inclusive and from them 7,839 parasite larvae were obtained. The host species at Bolson, Hoyo de Epuyen, Puelo and Repollos B, consisted of *Dichroplus arrogans* and *D. pratensis*, with a small percentage of *D. elongatus*. At Repollos A, *D. democraticus* formed approximately 80 per cent. of the samples with *D. arrogans* and *D. pratensis* making up the remainder.

In most localities at best 70 per cent. of the maggots emerging from January collected hosts, pupate and emerge, and since parasitism tends to be highest in that month and host infestations are almost invariably small in the area, a great deal of material is lost for shipping purposes and subsequent parasitism in the field is lower. This second brood is composed mainly of *Protooderxia australis* Blanch., the dominant species in the zone, with *Tephromyiella neuquenensis* Blanch. and *Acridiophage caridei* Brethes present in very small numbers. From the second brood flies a few specimens of a fly which perhaps represents a fourth species were obtained and are being examined for determination.

Considerable mortality of larvae and even puparia in the soil containers was caused by diseases. In the more common type, the body darkened and became shapeless with the internal tissues breaking down to a dark brow fluid. This was due to bacteria. In another less common type, the larvae dried and hardened becoming pinkish in colour. Some occasional diseased hosts were observed in the rearing cages but the mortality was not comparable to that of the Sarcophagid larvae.

During the course of the season's work between three and four thousand overwintering parasite larvae were prepared for shipment in late May.

In early December, advice was received from Belleville that a shipment of Canadian grasshopper parasites for the use of the Argentine Department of Agriculture was being forwarded to the Canadian Embassy in Buenos Aires. When Dr. Lloyd left Buenos Aires for Patagonia on 22nd December, the shipment had not arrived and its handling was therefore left to the Canadian Embassy and the Argentine Ministry of Agriculture. Dr. Liebermann, Sub-director of the Institute de Investigaciones sobre la Langosta, later advised us that the rather extended shipping time and a further week's delay by the customs authorities in Buenos Aires, resulted in the loss of the greater part of the material.

Dr. Lloyd states that it is becoming increasingly difficult to suggest further work in the project likely to give reasonable returns for the funds expended. A survey of the Argentine wheat belt north of Bahia Blanca might be made. Heavy infestations of grasshoppers are known to occur in this region but climatic dissimilarity to Canadian areas, and the lack of any local indications of appreciable parasitism strengthened by first-hand evidence of very poor parasitism in comparable habitats in Uruguay, suggest that such a survey would probably give much poorer results than the Patagonian areas. The Andine foothills and grass steppe regions of Rio Negro and Chubut carry small grasshopper populations, but a relatively rich Sarcophagid fauna, so that some parasitism generally occurs in all sampling stations. There remains in these parts of Argentina large sections of country around Cholila, Esquel and Trevelin, lying south of El Bolson, which have not yet been examined to date, though the writer doubts if new parasite species would be encountered or if collections and shipments would greatly exceed those from the regular stations mentioned above. Diseases and the enemies of the egg stages might, however, be investigated.

Insects attacking Vegetable Crops

Potato Tuber Moth (*Phthorimaea operculella* Zell.)

Work on the parasites of the Potato Tuber Moth was continued at Riverside, California, by Mr. W. F. Sellers. During the financial year 1947-48, thirty-one consignments consisting of 9,620 potato tuber moth larvae attacked by the Ichneumonid, *Omergus phthorimaeae*, were shipped to Australia to assist in their programme of using the natural enemies of the pest to counteract the injury to plants and tubers in the potato-growing areas. Unfortunately, a large-scale rearing technique for the laboratory production of this parasite has not yet been developed, but improved laboratory methods have enabled us to make larger and more satisfactory shipments.

Parasite stocks of *Microbracon gelechiae, Chelonus phthorimaeae, Copidosoma kechleri* and *Omergus phthorimaeae*, were carried through the winter for the large-scale rearing during May for shipment to Bermuda.

It should be emphasised that all the parasites of the Potato Tuber Moth, shipped by the Bureau were reared in the laboratory in order to avoid the danger of sending secondary parasites. This necessarily increases very considerably the work on the project.

Diamond Back Moth (*Plutella maculipennis* Curt.)

A request has been received from the Department of Agriculture on the island of Grenada in the West Indies, for the parasites of the Diamond Back Moth. Material will be collected for shipment as soon as possible.

Insects attacking Deciduous Fruits

San José Scale (*Aspidotus perniciosus* Comst.)

At the request of Professor Filippo Silvestri who has at various times rendered very valuable service to the Bureau in work carried on in Italy, an effort was made to secure consignments from North America, consignments of San José Scale attacked by the parasite *Prospaltella perniciosi* Tow. Eventually, material from a region where this parasite is known to be present was obtained from Georgia, through the kind help of Mr. Oliver Snapp and this was despatched by airmail to

Professor Silvestri. Unfortunately, few specimens of the desired parasite were obtained. A further collection will be arranged as soon as possible as the establishment of *Prospaltella perniciosi* in Southern Europe is desirable.

It may be noted that the San José Scale is a serious pest in certain parts of India and that the Bureau has been approached by Indian entomologists in regard to its biological control.

Insects affecting Forest and Shade Trees

Spruce Budworm (*Tortrix fumiferana* Clem.)

Mr. W. F. Sellers remained in charge of this project in Europe during the early part of the year but returned to Riverside on 1st August, after which work was continued under the direction of Dr. G. E. Bucher, seconded to the staff of the Bureau by the Canadian Department of Agriculture. The object of the investigation undertaken at the request of the Dominion Entomologist, was the location of diseases and parasites of Tortricids allied to the North American Spruce Budworm and particularly the European Budworms, *Archips murinana* and *A. histrionana*.

During the course of the survey, which was carried out under great difficulties, owing to the abnormal conditions in post-war Europe, forest areas were visited in Germany, France, Czechoslovakia, Belgium, Holland and other countries. A temporary staff of investigators and collectors was organised. Some infestations of the European Budworms were located but, unfortunately, too late in the season to provide material for disease and parasite work. Extensive preparations have been made and the necessary equipment assembled to permit the development of the project during the early months of the next financial year.

Bermuda Cedar Scales (*Diaspis visci* Schr. and *Lepidosaphes newsteadi* Sulc.)

The work undertaken on this project during the first three months of 1947 has been described in the annual report for 1946-47. During the financial year 1947-48 operations were continued by the Director, assisted by Mr. J. W. Waterston, Plant Pathologist of Bermuda and Mrs. W. R. Thompson. In May, Mr. Waterston was transferred to West Africa. About the middle of June, Dr. G. C. Ullyett was appointed to the staff of the Bureau and came to Bermuda from South Africa by air. The Director and Mrs. Thompson returned to Belleville on 21st June. Dr. Ullyett continued work until the end of August when he was called to Belleville to take part in the collection of *Loxostege* parasites in Western Canada.

During the first six months of the financial year the survey work and the importation of natural enemies of the scales was continued and intensified. Extensive rearings and statistical counts of scales and parasites were made from all parts of Bermuda.

From California, Dr. F. G. Holdaway despatched forty-four consignments of scale-feeding Coccinellids, including *Lindorus lophanthae, Orcus chalybeus, Zagloba ornata* and a species then determined as *Chilocorus stigma* but which, on later information obtained by Mr. Sellers, is more probably *C. confusor*. Thirty-six thousand, five hundred and eighty-nine beetles were shipped of which the great majority were *Lindorus lophanthae* since this species appeared, on the basis of experiments made in Bermuda, to be the most promising. All species were found, however, to feed and reproduce on *Diaspis visci* when confined in bags.

From Trinidad, Dr. F. J. Simmonds made twenty-one shipments to Bermuda. These included several species of scale-feeding Coccinellids, of which the most promising appeared to be *Azya trinitatis*. A number of specimens of *Cryptognatha nodiceps*, whose effective work against the Coconut Scale in Fiji, has been described by Dr. Taylor, were also imported but this beetle showed no interest in the cedar scales. About twenty-three hundred specimens of the valuable aphid-feeding species, *Cycloneda sanguinea* were also introduced from Trinidad in the hope that they would be useful either against the Cedar Aphid or against the Citrus Aphid.

In Italy, Prof. F. Silvestri very kindly organised the collections of the European Coccinellid, *Chilocorus bipustulatus* and also of the Oyster Shell Scale, *Lepidosaphes ulmi* in the hope that some of its parasites, particularly the Aphelinid, *Physcus testaceus*, might be useful against *Lepidosaphes newsteadi*. Unfortunately, the air services utilised took well over a month to get the shipments from Rome to Bermuda and most of the material was dead on arrival. However, some thirty living *Chilocorus* were secured and these, when confined in bags, fed and reproduced on *Diaspis visci* so the shipment proved of value from the experimental standpoint.

Owing to the promising behaviour of *Lindorus lophanthae*, in comparison with the other species tested, it was considered desirable to liberate these in very large numbers. No practicable method of mass rearing, suitable for Bermuda, was available so it was necessary to rely on field collections. A survey of the literature revealed the fact that *Lindorus lophanthae* was at one time extremely abundant in Mauritius where it was very effective against the Sugar-cane scale. Through the kind co-operation of the Mauritius Department of Agriculture nine airmail shipments of *Lindorus* and of *Chilocorus nigritus* were obtained, comprising some twenty-four thousand individuals of which a good proportion arived alive and in good condition thanks to the excellent packing methods devised by the Assistant Entomologist, Mr. Andre Moutia.

Finally, from Belleville, Canada, thanks to the help of Mr. A. B. Baird, we secured consignments of the Oyster Shell Scale, *Lepidosaphes ulmi* and the predacious mite, *Hemisarcoptes mali* which produced some eight thousand specimens of the Aphelinid, *Aphytis mytilaspidis* LeB and five hundred specimens of the mite.

The results of the survey work which involved the counting and identification of some 17,000 scales and parasites indicated in the first half of 1947, a rise of the parasite population to a relatively high proportion and the survival of relatively few scale progeny. The additional studies made by Dr. Ullyett confirmed these results and by the time he left the island at the end of August, some signs of cedar recovery were evident. *Lindorus Lophanthae* was beginning to turn up in recovery collections of infested cedar branches and *Chilocorus stigma* had been found feeding in the open on *Lecanium* and hibiscus though not yet on the cedar scales. The general prospects therefore seemed favourable.

However, toward the end of October, a rather severe hurricane passed close to Bermuda and reports received in the weeks following suggested a considerable deterioration of the cedars. At the request of the Agricultural Department, the Director accompained by Mr. A. B. Baird, officer in charge of the Dominion Parasite Laboratory and Canadian Correspondent of the Bureau, flew to Bermuda on 10th December and made a rapid but fairly thorough survey, returning on 20th

December. At the beginning of February, Dr. G. C. Ullyett flew down remaining for about three weeks, Parasitism was then markedly lower than before the hurricane, while the scale infestation seemed to be increasing. *Lindorus lophanthae* was found in small numbers over a considerable area but none of the other imported species was observed.

Dr. Ullyett, like the Director and Mr. Baird, found a relatively low parasite population, some indication of an increase of *Lindorus*, but an apparent recrudescence of the scale population. The observations clearly indicated the need for more extensive studies and perhaps additional introductions. On 1st March, the Director and Mrs. W. R. Thompson flew to the Colony, remaining until about the middle of April.

The extensive survey then made showed a considerable change in the situation. The *Diaspis* importation, as had been expected, had spread almost all over the island while the *Lepidosaphes* infestation had spread only a relatively short distance. On the other hand, the degree of infestation by both scales was distinctly less than in the summer of 1947 and even less than it had been in December of that year. A survey by beating for Coccinellids showed that *Lindorus* was relatively abundant and widely distributed. In some areas every tree infested by *Diaspis* produced *Lindorus* and in some cases as many as fifty larvae and adults were beaten from a short branch. Of the other ladybirds introduced in 1947 not a single specimen was found. *Aphytis mytilaspidis* was recovered in rather small numbers but there was no trace of the mite *Hemisarcoptes mali*. The general appearance of the cedars, in the infested areas, was far from satisfactory but this appeared to be due rather to the abrupt removal of infested foliage by the hurricane than to defoliation due simply to the scales.

The data, though consistent, were difficult to interpret. It was possible that the parasite and predator populations had been decimated by the October hurricane. The complete absence of Coccinellids other than *Lindorus* was, however, difficult to account for. Some of these beetles hibernate, even in a relatively mild climate. This notably is the case with *Novius cardinalis* in Bermuda. It may however be noted that none of the other species released in 1947 were recovered in summer surveys and there is no evidence that they have become established in Bermuda.

Since only *Lindorus* was recovered and its distribution, though extensive, was rather patchy, it seemed advisable to organise new introductions. Mr. Sellers therefore set up a breeding room for *Lindorus* and during the month of March sent seven additional shipments comprising 2,277 adult beetles which were released at suitable points on the island. From Porto Rico, thanks to the kind co-operation of Dr. K. A. Bartlett, Director of the Federal Experiment Station at Mayaguez, one shipment of *Chilocorus cacti* comprising 320 specimens and three shipments of *Egius platycephalus* comprising 1,136 specimens were obtained in excellent condition. The preliminary results obtained with these species were somewhat encouraging but no definite evidence of establishment on cedar scale was obtained by the end of the financial year. From Mauritius, the Entomological Department kindly sent additional consignments of *Chilocorus nigritus* of which two, containing each 5,000 adults, were received in Bermuda during March. In Europe, Dr. L. Mesnil organised collections of scale parasites and predators in France, Switzerland and Italy. During the month of March two consignments of *Chilocorus bipustulatus* were received from Antibes, France, comprising a total of about one hundred specimens.

Since Europe is the original home of the cedar scales, an effort is being made to discover their specific native enemies and if these are found they will as soon as practicable be introduced into Bermuda.

The results of the attempt to control the Bermuda cedar scales by the introduction of natural enemies are, up to the present, somewhat disappointing. It was believed that the absence of scale-feeding Coccinellids in Bermuda was due mainly to its isolation since a number of scale insects are well established there. However, it may be that local conditions are really unfavourable to ladybirds though it is difficult to say what factors are involved. Further work in the island is necessary.

Diaspis visci is a pest on juniper in nurseries in certain parts of Ontario. In the early part of the financial year shipments of Bermuda material heavily parasitised by *Aspidiotiphagus lounsburyi* were therefore shipped to the Dominion Parasite Laboratory. Colonies of the parasite were subsequently released in Western Ontario but whether the parasite is established is not yet known.

Insects attacking Tropical Crops

California Red Scale (*Aonidiella aurantii* Mask.)

As mentioned in previous reports, the Chinese race of *Comperiella bifasciata*, which, unlike the ordinary strain, is able to complete its development in the California Red Scale, is available for distribution in Riverside, California. During the past financial year, Mr. Sellers has reared this species to provide shipments for the Government of Palestine. Four shipments, containing 1,740 scales attacked by *Comperiella*, were despatched to Palestine.

Coconut Scale (*Aspidiotus destructor* Sign.)

At the request of Mr. R. W. E. Tucker, Entomologist of Barbados, some of the Coccinellid predators on the Coconut Scale were collected and shipped from Trinidad to Barbados by Dr. F. J. Simmonds. The shipments consisted mainly of *Pentilia* sp. and *Azya trintitatis*. The three shipments provided a total of 3,630 adult beetles. *Azya trintitatis* has already been recovered in the field but is not yet known to be permanently established in Barbados.

Citrus Aphid (*Toxoptera aurantii* Koch.)

As has been mentioned in the discussion of the Bermuda cedar work, a number of consignments of *Cycloneda sanguinea*, the Coccinellid enemy of the Citrus Aphid, were successfully despatched to Bermuda from Trinidad by Dr. F. J. Simmonds. Individuals liberated in an infested citrus orchard by Mr. Waterston were later observed by him to be breeding there. It is hoped therefore that this species has established itself Bermuda.

Sugar-cane Moth Borers (*Diatraea* spp.)

In May, 1947, the Government of Mauritius authorised expenditure for the collection, rearing and shipment of certain parasites of the *Diatraea* Sugar-cane Borers in the hope that they would be useful against *Procera sacchariphagus*, which attacks sugar-cane in Mauritius. It was decided to ship *Paratheresia claripalpis, Lixophaga diatreae* and *Metagonistylum minense*.

The first species shipped was *P. claripalpis*, since this was obtainable in Trinidad. Field-collected puparia cannot be shipped owing to the danger of introducing the secondary parasite, *Trichopria*. Larvae were therefore reared from field-collected caterpillars and the puparia shipped by air at frequent intervals. In the course of this work data were collected on the rate of parasitism among the various species of *Diatraea* (*D.*

saccharalis, D. impersonatella and *D. canella*) and the relative abundance of these species in the field and these results were summarised for the Trinidad Department of Agriculture in a special memorandum. At the request of the Department another memorandum was prepared, concerning the possibility of improving the biological control of Sugar-cane Moth Borers in Trinidad. A number of parasites of the European Corn Borer (*Pyrausta nubilalis* Hüb.) obtained from the United States were also tested on the Sugar-cane Borers.

At the end of June, 1947, a trip was made to Antigua to secure shipments of *Lixophaga diatreae*. Consignments were shipped directly to Mauritius from Antigua and a stock was brought to Trinidad for propagation. Breeding work was continued until mid-September.

In all, eighteen shipments of *Paratheresia* including 1,246 individuals and twelve shipments of *Lixophaga*, including 1,301 individuals, were made during the course of the work. Experiments in Mauritius showed that *Paratheresia claripalpis* cannot develop in *Proceras* but *Lixophaga diatreae* is able to do so. Further consignments of the latter species have therefore been requested. Material of *Metagonistylum* could not be obtained but it is planned to make large shipments of it during the next financial year.

Insects attacking Injurious Weeds

Prickly Pear (Opuntia spp.)

As certain species of Prickly Pear are serious pests in South Africa and the Cactus insects hitherto introduced have not given entirely satisfactory control, additional introductions of the weevil, *Cactophagus spinolea*, were considered advisable. In order to make these, Mr. W. F. Sellers had to go by car from Riverside, California, to Mexico City in August, 1947, almost immediately after his return from the Budworm work in Europe. Though the season was then far advanced, he succeeded in collecting almost 1,400 weevils which were despatched by air to South Africa.

Black Sage (Cordia macrostachya.)

Work on the insect enemies of this plant which was introduced from the West Indies into Mauritius and has become a serious pest there, was continued in Trinidad by Dr. F. J. Simmonds.

At the beginning of April, 1947, it was learned that adequate supplies of the leaf-feeding beetle *Physonota alutacea*, had been received in Mauritius and that breeding and liberation were planned. Later it appeared probable that this species would be unsuccessful in Mauritius, possibly owing to the attacks of the predacious ant, *Solenopsis geminata* F. Extensive feeding test were completed in June, 1947.

The biology and feeding preferences of another important defoliating beetle, *Schematiza cordiae* B., were also studied. Trial shipments were made by airmail in June, 1947, and later (July-September) large shipments were sent by air express. Although, owing to delays in transit, these shipments were only moderately successful, enough living material was received in Mauritius to start breeding work. Feeding tests in Mauritius indicated that larvae could feed on cabbage though *Schematiza* has never been observed on it in Trinidad and did not feed on it in laboratory tests. At the end of March, 1948, liberations of *Schematiza* were made in Mauritius.

During the period under review further studies of seed-destroying insects were made. Efforts to breed this species were unsuccessful partly owing to the difficulty of obtaining insect-free fruit and flowers. However, information on the habits and relationships of the various species reared from the seeds has been secured.

Surveys of Cordia insects were made during the course of the year in Tobago, Antigua, Grenada and Barbados. During the visit to Washington, D.C., various aspects of the Cordia problem were discussed with the experts of the United States National Museum.

Parasite Catalogue

Work on the Parasite Catalogue was considerably interfered with by the absences of the Director in Bermuda but during the financial year of 1947-48, Part 9 was published containing the parasites of the Lepidoptera of genera Q to Z inclusive; 596 volumes of the Catalogue were disposed of. This number includes the free distribution to contributing governments and collaborators and those supplied to the Central Sales Branch of the Imperial Agricultural Bureaux in Aberystwyth, Great Britain.

Publications

During the course of the year four papers were published by Dr. F. J. Simmonds as follows:—

"Improvement of sex-ratio of a parasite by selection"—in Canadian Entomologist, 1947, pp. 41-44.

"The Biology of parasites of *Loxostege sticticalis* in North America—*Bracon vulgaris* Cress."—in Bull. Ent. Research, 38, pp. 145-155.

"The Biology of parasites of *Loxostege sticticalis* in North America—*Meteorus loxostegei* Vier."—in Bull. Ent. Research, 38, pp. 373-379.

"The Biology of parasites of *Loxostege sticticalis* in North America—*Phytodietus pulcherrimus* Cress."—in Parasitology, 38 pp. 150-156.

A summary of Dr. Ullyett's address at the meeting of the American Association of Economic Entomologists in Chicago was published by the Journal of the Association as a special Editorial.

Staff

D. G. C. Ullyett, formerly in charge of the Parasite Laboratory in the South African Entomological Service, was appointed to the staff of the Bureau in June, 1947.

Dr. Louis Mesnil, the well-known authority on the parasitic Diptera and co-author with Dr. Balachowsky of the great two volume work on insects injurious to agriculture in Europe, was appointed in March, 1948. Dr. Mesnil will have charge of the European work of the Bureau with headquarters in Zurich, Switzerland.

Miscellaneous

The Director attended the Annual Meeting of the Entomological Society of Ontario, in November, 1947, and gave a talk on the Bermuda Cedar Scale work, illustrated by Kodachrome slides. At this meeting the Director was elected Editor of the Canadian Entomologist. In December the Director and Dr. G. C. Ullyett attended the meeting of the American Association of Economic Entomologists, in Chicago, where Dr. Ullyett read a paper on the relation between biological control work and insecticidal treatments, as illustrated by recent work in South Africa.

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Important Notice—

From 1st January 1948, the name of this organisation was changed to "Commonwealth" Agricultural Bureaux. Consequently, all addresses appearing above use the new term "Commonwealth."

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